United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Alabama Agricultural
Experiment Station and
Alabama Soil and Water
Conservation Committee

Soil Survey of Walker County, Alabama

How To Use This Soil Survey

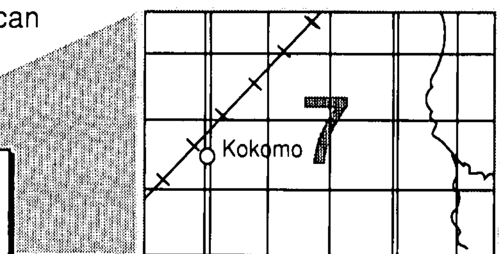
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

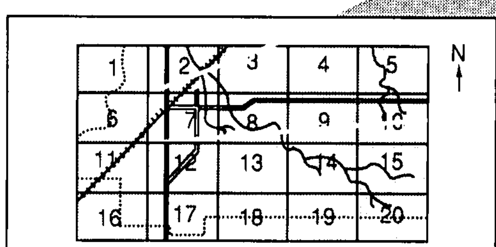
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



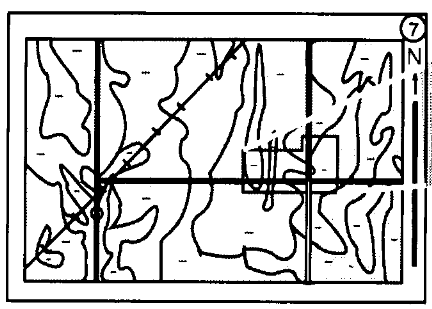
MAP SHEET

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.

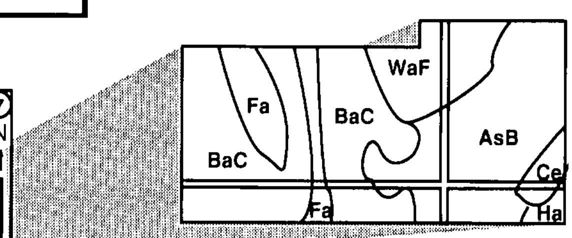


INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1985. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This survey was made cooperatively by the Soil Conservation Service, the Alabama Agricultural Experiment Station, the Alabama Cooperative Extension Service, the Alabama Soil and Water Conservation Committee, the Alabama Department of Agriculture and Industries, and the Alabama Surface Mining Commission. It is part of the technical assistance furnished to the Walker County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Improved pasture of fescue on the Townley soil in an area of Sunlight-Townley complex, 15 to 45 percent slopes, in Walker County. Farm ponds in areas of the Townley soil provide water for livestock.

Contents

Issued March 1992

Index to Map Units

Summary of Tables

Foreword

This soil survey contains information that can be used in land-planning programs in Walker County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

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Soil Survey of Walker County, Alabama

By Robert W. Stevens, Soil Conservation Service

Fieldwork by Robert W. Stevens, Charles D. Bowen, Delarie Palmer, and Edward J. Russell, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with the Alabama Agricultural Experiment Station, the Alabama Cooperative Extension Service, the Alabama Soil and Water Conservation Committee, the Alabama Department of Agriculture and Industries, and the Alabama Surface Mining Commission

WALKER COUNTY is in the northwestern part of Alabama (fig. 1). It has an area of 514,285 acres, or nearly 804 square miles. It is bordered on the north by Cullman and Winston Counties, on the east by Blount and Jefferson Counties, on the south by Tuscaloosa County, and on the west by Fayette and Marion Counties. Jasper, the county seat and largest city, has a population of about 14,000, and 10 other incorporated towns in the county have a total population of about 69,000. Jasper is about 40 miles by road northwest of Birmingham, Alabama's largest city.

This survey updates an earlier soil survey of Walker County, published in 1915.

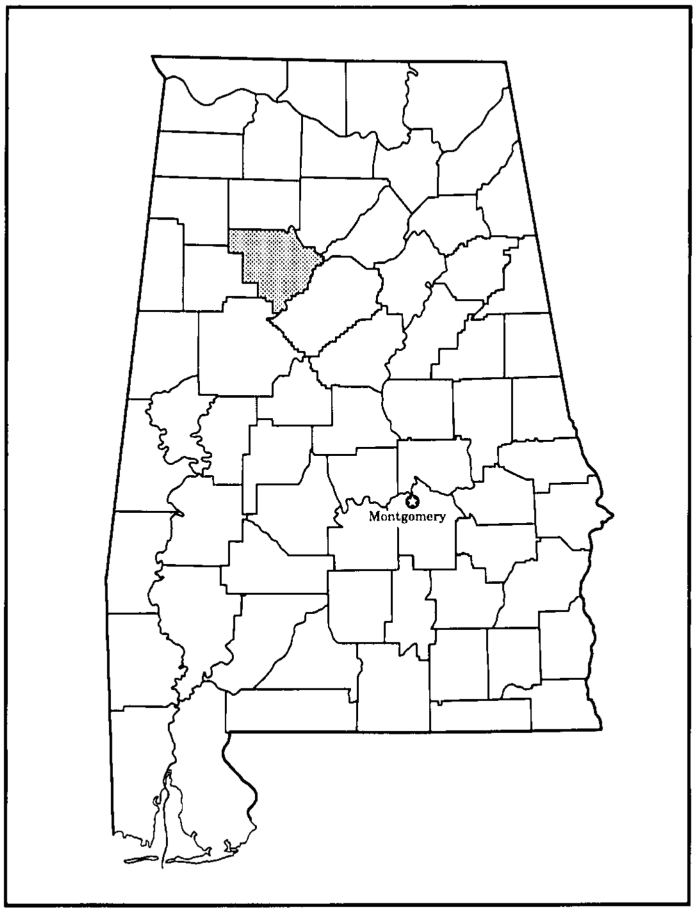

Figure 1.—Location of Walker County in Alabama.

General Nature of the County

This section gives general information about the county. It describes history, transportation facilities, geology and physiography, natural resources, and climate.

History

Indian tribes were in the area of what is now Walker County when the first settlers arrived in the early 1800's. In 1824, the county was formed from parts of Marion and Tuscaloosa Counties. It was named for John W. Walker, Chairman of the Constitutional Convention in 1819. During the 1830's, Creek, Choctaw, and Chickasaw Indians were removed from the area.

The development of Walker County was slow. Little growth occurred until the 1900's. Since then, economic development has been considerable and has shifted from cotton and row crops to coal and timber.

Transportation Facilities

Walker County is served by 177 miles of state highways and 1,500 miles of county roads. U.S. Highway 78 is the main east-west highway. From Jasper, Alabama Highway 69 runs southwest and northeast, Alabama Highway 269 runs south, Alabama Highways 195 and 257 run north, and Alabama Highways 124 and 102 run west. Three railroad lines also serve the county. The Walker County Airport provides daily airline service. The Black Warrior River provides barge transportation from Walker County to Mobile or to the Tennessee-Tombigbee canal or waterway.

Geology and Physiography

All of Walker County is underlain by the nearly level bedded Pottsville Formation. This formation is of Pennsylvanian age. The part of it in Walker County is entirely in the Warrior coal field. The sediments in this formation are sandstone, siltstone, and shale and thin layers of limestone. Some of the sandstone strata are very resistant to weathering and tend to result in gently sloping and moderately sloping ridgetops dominated by sandstone-derived soils, steep side slopes of finer textured sediments, and colluvial material on narrow stream terraces and toe slopes. Drainage patterns are dendritic.

The many coal seams in the Warrior coal field are mined on or below the surface. The major seams that are mined are the Black Creek, May Lee, Newcastle, America, Nickle Plate, Pratt, and Cobb seams.

Coastal Plain sediments of Cretaceous age cap the Pennsylvanian sediments in the western part of the county. They consist of unconsolidated sand, silt, and clay and many rounded pebbles.

Sediments of Pliocene to Recent age are along the major drainageways in the county.

Natural Resources

Coal, the main natural resource and economic base of Walker County, is in the Warrior coal field. Extensive open-pit mining constantly changes the landscape and soils.

About 69 percent of the land in the county is forested. Mixed stands of pine and hardwoods predominate. Most of the trees harvested in the county are loblolly pine, Virginia pine, and longleaf pine.

The Sipsey and Mulberry Forks of the Black Warrior River flow through Walker County. The county also has several other large streams, including Blackwater, Lost, and Wolf Creeks. Two manmade lakes, Smith Lake and Walker County Lake, provide opportunities for recreational activities.

About 16 percent of the land in Walker County is pasture, and 2 percent is cropland *(12)*. At one time, cotton and other crops made up a large part of the agricultural output, but they have been less important since the 1930's. Forage grasses are used in strip-mine reclamation, which continually adds more acreage of pasture.

Coal mines can use the overburden material by selling clay for potter work or, more commonly, industrial uses.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

In Walker County, summers are hot in the valleys and slightly cooler in the hills and winters are moderately cold. Rains are fairly heavy and well distributed throughout the year. Snow falls nearly every winter, but the snow cover generally lasts only a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Jasper, Alabama, in the period 1960 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 42 degrees F and the average daily minimum temperature is 29 degrees. The lowest temperature on record, which occurred at Jasper on January 30, 1966, is 20 degrees. In summer, the average temperature is 77 degrees and the average daily maximum temperature is 89 degrees. The highest recorded temperature, which occurred at Jasper on July 17, 1980, is 108 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 58.3 inches. Of this, nearly 28 inches, or more than 45 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 23

inches. The heaviest 1-day rainfall during the period of record was 8.10 inches at Jasper, Alabama, on December 26, 1973. Thunderstorms occur on about 58 days each year.

The average seasonal snowfall is about 2 inches. The greatest snow depth at any one time during the period of record was 6 inches. On the average, 1 day had at least 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 9 miles per hour, in spring.

Locally severe storms, including tornadoes, strike occasionally in or near the county. They are of short duration and cause variable and spotty damage.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they

drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

Soil Survey Procedures

The general procedures followed in making this survey are described in the National Soils Handbook of the Soil Conservation Service. The survey of Walker County published in 1915 and a geologic map of the county *(19)* were used.

Before the fieldwork began, preliminary boundaries of landforms were plotted stereoscopically on high altitude aerial photographs taken in 1976 at a scale of 1:80,000 and enlarged to a scale of 1:24,000. U.S. Geological Survey topographic maps at a scale of 1:24,000, photographs at the same scale and other scales, and soil surveys produced for conservation planning since 1912 were used to relate land and image features. A vehicular reconnaissance was made before the landscape was traversed and transected.

Traverses were made on foot and by truck. Most were made at intervals of about one-fourth mile. Traverses at closer intervals were made in areas of high variability.

Soil examinations along the traverses were made 100 and 400 yards apart, depending on the landscape and soil pattern *(11)*. Observations of such items as landforms, blown down trees, vegetation, roadbanks, and evidence from animals and insects were made continuously without regard to spacing. Soil boundaries were determined on the basis of landform position, soil examinations, observations, and photo interpretation. The soil material was examined with the aid of a spade, a hand auger, or a truck probe to a depth of about 5 feet or to bedrock if the bedrock was within a depth of 5 feet. The pedons described as typical were observed and studied in pits that were dug by hand.

Samples for chemical and physical analyses and engineering test data were taken from the site of the typical pedon of most of the major soils in the survey area. The analyses were made by Auburn University, Auburn, Alabama, and by the Alabama Highway Department, Montgomery, Alabama. Some of the results of the analyses are published in this soil survey.

After completion of the soil mapping on high altitude aerial photographs, map unit delineations were transferred by hand to photo base sheets at a scale of 1:24,000. Surface drainage was mapped in the field. Cultural features and section corners were transferred from U.S. Geological Survey 7.5-minute topographic maps and were recorded from visual observations.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area vary widely in their suitability for major land uses. Table 4 shows the extent of the map units shown on the general soil map. It also shows the suitability of each for major land uses and the soil properties that limit use. *Cultivated crops* are those grown extensively in the survey area. *Pasture and hayland* refers to areas of improved locally grown grasses and legumes. *Woodland* refers to areas of native or introduced trees. *Urban uses* include residential, commercial, and industrial developments. *Intensive recreation areas* are campsites, picnic areas, ballfields, and other areas that are subject to heavy foot traffic. *Extensive recreation areas* are those used for nature study and as wilderness.

1. Sunlight-Townley-Sipsey

Moderately deep and shallow, gently sloping to very steep, well drained soils that have a loamy or clayey subsoil; formed in material weathered from shale, siltstone, and sandstone

This map unit is on highly dissected, steep and very steep side slopes, on narrow to broad ridgetops and plateaus, and in narrow drainageways and on stream bottoms. Slopes range from 2 to 45 percent. The natural vegetation is mainly hardwoods and pine.

Very little of the acreage has been cleared and used for agricultural crops. Much of the coal mining in the county is in areas of this map unit. Many strip-mined areas have been reclaimed and support trees and grasses.

This map unit makes up about 65 percent of the survey area. It is about 33 percent Sunlight and similar soils, 24 percent Townley soils, 13 percent Sipsey soils, and 30 percent soils of minor extent.

The sloping to very steep, shallow Sunlight soils are on side slopes. Typically, they have a surface layer of dark brown channery silt loam and a subsoil of yellowish brown and strong brown channery and very channery silty clay loam. Montevallo soils are very similar to the Sunlight soils. They are included in this unit.

The gently sloping to steep, moderately deep Townley soils are on rolling ridgetops and steep side slopes. Typically, they have a surface layer of very dark grayish brown silt loam and a subsoil of strong brown clay.

The sloping to steep, moderately deep Sipsey soils are on ridgetops and side slopes. Typically, they have a surface layer of brown and yellowish brown loamy sand and sandy loam and a subsoil of strong brown sandy clay loam.

Minor in this map unit are the Nauvoo and Nectar soils on narrow to broad ridgetops and upper side slopes, the Wynnville soils on narrow terraces, the Mooreville and Pruitton soils along drainageways and flood plains, and the Brilliant and Palmerdale soils in mined areas that have been reclaimed.

This map unit is used mainly as woodland. A few small areas on the broader ridgetops are used for pasture or cultivated crops. These soils are poorly suited to cultivated crops. The suitability for pasture is fair or poor. The slope and the depth to bedrock are the main limitations. Erosion is a moderate or severe hazard when the soils are tilled. The shallow soils are

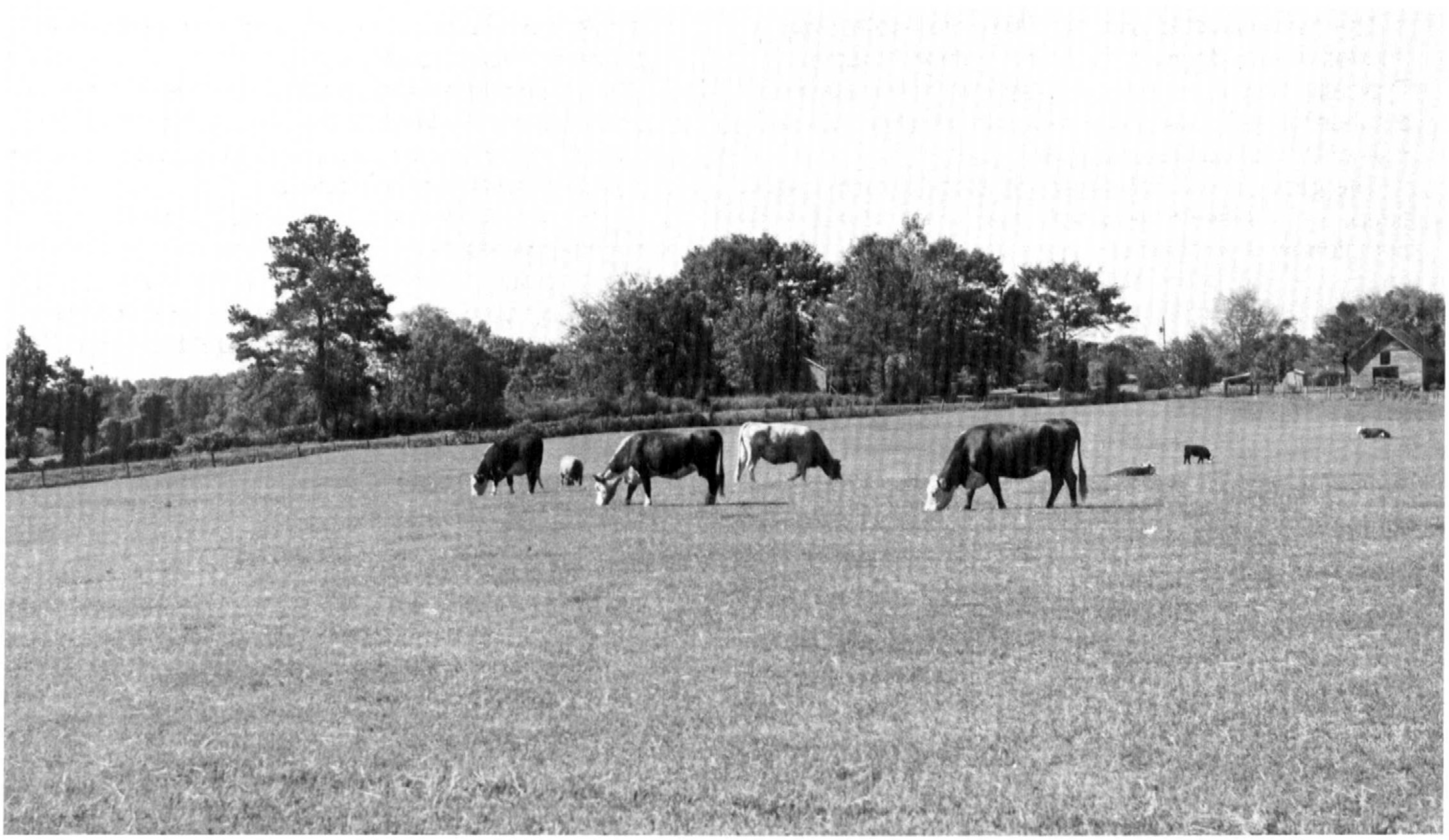

Figure 2.—Improved pasture on Wynnville fine sandy loam, 0 to 4 percent slopes, in an area of the Wynnville-Sipsey-Townley general soil map unit. The woodland in the background is in an area of Townley soils.

droughty. The droughtiness restricts plant growth in most years. Crop rotations, terraces, cover crops, and contour farming are necessary to maintain productivity and control erosion in cultivated areas.

The suitability for woodland is good to poor. The productivity of the woodland is low to moderate. The dominant species are oaks, hickories, yellow poplar, Virginia pine, shortleaf pine, and loblolly pine. Many areas have been clearcut and are replanted to pine. The slope restricts the use of logging equipment and limits harvesting and replanting in many areas. Erosion is a hazard along logging roads and skid trails.

These soils are poorly suited to urban uses because of the slope, the depth to bedrock, and slow permeability in the Townley soils.

These soils are poorly suited to intensively used recreation areas because of the slope and surface stones. They are well suited to extensive recreation areas.

2. Wynnville-Sipsey-Townley

Deep and moderately deep, nearly level to strongly sloping, moderately well drained and well drained soils that have a loamy or clayey subsoil; formed in loamy colluvium and material weathered from sandstone and shale

This map unit is on broad upland ridgetops, plateaus, and old high terraces dissected by narrow drainageways. Slopes range from 0 to 15 percent. The natural vegetation is mixed hardwoods and pine.

Most of the acreage in this map unit has been cleared and is used for pasture or cultivated crops (fig. 2). Some areas are used as woodland, and small areas are used for urban development.

This map unit makes up about 3 percent of the survey area. It is about 54 percent Wynnville soils, 23 percent Sipsey soils, 17 percent Townley soils, and 6 percent soils of minor extent.

The nearly level to sloping, deep, moderately well drained Wynnville soils are on old upland terraces. Typically, they have a surface layer of brown loam and a subsoil of yellowish brown loam and sandy clay loam. Part of the subsoil is a fragipan.

The gently sloping and strongly sloping, moderately deep, well drained Sipsey soils are on rolling ridgetops and side slopes. Typically, they have a surface layer of brown and yellowish brown loamy sand and sandy loam and a subsoil of strong brown sandy clay loam.

The sloping and strongly sloping, moderately deep, well drained Townley soils are on ridgetops and side slopes. Typically, they have a surface layer of very dark grayish brown silt loam and a subsoil of strong brown clay.

Minor in this map unit are the Nauvoo, Nectar, and Sunlight soils on ridgetops and side slopes and the Mooreville, Pruitton, Spadra, and Whitwell soils on terraces and flood plains.

The major soils are well suited to cultivated crops and pasture. The hazard of erosion is moderate or severe in the more sloping areas if these soils are tilled. Crop rotations, terraces, waterways, cover crops, and contour farming are necessary to maintain productivity and control erosion.

The suitability for woodland is good. The productivity of the woodland is moderate to high. A few areas support mixed native hardwoods and pine, and some areas of pasture and cropland have been converted to pine woodland.

These soils are poorly suited to urban uses. Slow permeability in the lower part of the subsoil in the Wynnville and Townley soils, the seasonal wetness of the Wynnville soils, and low strength in the Townley soils restrict many urban uses. In some areas the slope is a limitation affecting some urban uses.

These soils are only fairly well suited to intensively used recreation areas because of the wetness. They are well suited to extensive recreation areas.

3. Spadra-Whitwell-Mooreville

Deep, nearly level and gently sloping, well drained and moderately well drained soils that have a loamy subsoil; formed in fluvial and alluvial deposits

This map unit is on narrow to fairly broad, low stream terraces and flood plains along the major streams in the county. Slopes range from 0 to 3 percent. The soils are flooded, mainly late in winter and early in spring. The natural vegetation is mainly hardwoods and a few scattered pine.

Most of the acreage is used as woodland. Some of the larger areas have been cleared and are used for pasture or cultivated crops.

This map unit makes up about 4 percent of the survey area. It is about 38 percent Spadra soils, 25 percent Whitwell soils, 20 percent Mooreville soils, and 17 percent soils of minor extent.

The nearly level and gently sloping, well drained Spadra soils are at the higher elevations. Typically, they have a surface layer of dark yellowish brown fine sandy loam. The upper part of the subsoil is dark yellowish brown loam, and the lower part is dark brown, mottled clay loam.

The gently sloping, moderately well drained Whitwell soils are in intermediate positions on the landscape. Typically, they have a surface layer of brown silt loam. The upper part of the subsoil is light yellowish brown loam mottled with brown and gray, and the lower part is brownish yellow and yellowish brown loam mottled with light gray and pale brown. The underlying material is mottled yellow, gray, and brown, stratified loam and sandy loam. These soils have a seasonal high water table.

The nearly level, moderately well drained Mooreville soils are in sloughs and depressions in the lowest positions on the landscape. Typically, they have a surface layer of dark grayish brown silt loam. The upper part of the subsoil is yellowish brown loam mottled with gray, and the lower part is mottled gray and brown loam.

Minor in this map unit are the Pruitton and Wynnville soils on flood plains and terraces and the Townley soils on the intersecting uplands.

The major soils are well suited to cropland and pasture. The flooding and the seasonal wetness delay tillage in some years. Suitable outlets for surface drainage systems are not readily available in some areas. Grazing when the soils are wet causes damage to the sod and compaction, which are the major concerns in managing pasture. Including a sod crop in the rotation helps to maintain tilth and increases the content of organic matter and yields.

The suitability for woodland is good. The productivity of the woodland is high. The dominant species are mixed hardwoods and pine. The flooding and the high water table in some of the soils restrict logging activities, but the higher areas have no significant limitations.

These soils are poorly suited to most urban uses because of the flooding and the seasonal high water table. Overcoming these limitations is difficult.

These soils are only fairly well suited to intensively used recreation areas because of the flooding and the

wetness. They are well suited to extensive recreation areas.

4. Townley-Sunlight

Moderately deep and shallow, gently sloping to moderately steep, well drained soils that have a clayey or loamy subsoil; formed in material weathered from shale, siltstone, and sandstone

This map unit is on gently sloping ridgetops and moderately steep side slopes on uplands dissected by narrow drainageways. Slopes range from 2 to 20 percent. The natural vegetation is pine and mixed hardwoods.

Most of the acreage is used as woodland. Some scattered small areas of the more gently sloping soils are used for pasture or cultivated crops.

This map unit makes up about 2 percent of the survey area. It is about 70 percent Townley soils, 10 percent Sunlight soils, and 20 percent soils of minor extent.

The gently sloping to moderately steep, moderately deep Townley soils are on ridgetops and side slopes. Typically, they have a surface layer of very dark grayish brown silt loam and a subsoil of strong brown clay.

The gently sloping to moderately steep, shallow Sunlight soils are on side slopes. Typically, they have a surface layer of dark brown channery silt loam and a subsoil of yellowish brown and strong brown channery and very channery silty clay loam.

Minor in this map unit are the Nauvoo soils on uplands and the Mooreville and Pruitton soils in narrow drainageways.

The suitability of the major soils is fair or poor for cultivated crops and good or fair for pasture. The main limitations are the slope and the depth to bedrock. Erosion is a moderate or severe hazard when these soils are cultivated. The shallow Sunlight soils are droughty. Plant growth is restricted in most years because of the lack of available moisture and the shallow root zone. Crop rotations, terraces, cover crops, and contour farming are necessary to maintain tilth and productivity, increase the content of organic matter, and control erosion. The soils are better suited to cool-season grasses and legumes than to other forage species because of the increase in the amount of available moisture during the wetter months of the year.

The suitability for woodland is good. The productivity of the woodland is moderate to low. The trees should be logged when the soils are dry. Logging when the soils are wet results in the formation of ruts in logging roads and skid trails, thereby creating an erosion hazard, especially in the more sloping areas.

These soils are poorly suited to urban uses because of slow permeability, the depth to bedrock, low strength, and the slope.

These soils are poorly suited to intensively used recreation areas because of slow permeability in the Townley soils and the slope in some areas. They are well suited to extensive recreation areas.

5. Sipsey-Nauvoo

Moderately deep and deep, gently sloping to moderately steep, well drained soils that have a loamy subsoil; formed in material weathered from sandstone or sandstone with interbedded siltstone and shale

This map unit is on narrow to broad, gently sloping to moderately steep, winding ridgetops dissected by a few intermittent drainageways. Slopes range from 2 to 15 percent. The natural vegetation is mixed hardwoods and pine.

Most of the acreage in this map unit is used for pasture or woodland. A few areas on the broader ridgetops are used for cultivated crops.

This map unit makes up about 10 percent of the survey area. It is about 57 percent Sipsey soils, 34 percent Nauvoo soils, and 9 percent soils of minor extent.

The sloping to moderately steep, moderately deep Sipsey soils are on narrow ridgetops and the upper side slopes. Typically, they have a surface layer of brown and yellowish brown loamy sand and sandy loam and a subsoil of strong brown sandy clay loam.

The gently sloping to moderately steep, deep Nauvoo soils are on the broader ridgetops. Typically, they have a surface layer of dark yellowish brown fine sandy loam. The subsoil is red sandy clay loam and clay loam. It is mottled in the lower part.

Minor in this map unit are the Bankhead, Nectar, Sunlight, and Townley soils on uplands and the Mooreville, Pruitton, Spadra, and Whitwell soils at the lower elevations and along drainageways.

Mainly because of the slope and droughtiness, the suitability of the major soils is fair or poor for cropland and fair for pasture. The sandy texture and depth to bedrock in the Sipsey soils result in droughtiness. Erosion is a moderate or severe hazard when the soils are tilled, especially on the steeper slopes. Crop rotations, terraces, cover crops, and contour farming are necessary to maintain tilth and productivity, increase the content of organic matter, and control erosion. Grazing when the soils are wet causes damage to the sod and compaction, which are the major concerns in managing pasture.

The suitability for woodland is good. The productivity

of the woodland is moderate. Erosion is the major management concern. The trees should be logged and most equipment used when the soils are dry. Logging when the soils are wet results in the formation of ruts in logging roads and skid trails, thereby creating an erosion hazard, especially on the steeper slopes.

These soils are poorly suited to most urban uses because of the depth to bedrock in the Sipsey soils and the slope in some areas.

These soils are only fairly well suited to intensively used recreation areas because of the slope in some areas. They are well suited to extensive recreation areas.

6. Smithdale-Townley

Deep and moderately deep, strongly sloping to steep, well drained soils that have a loamy or clayey subsoil; formed in loamy marine sediments and material weathered from shale and siltstone

This map unit is on highly dissected uplands, on narrow, winding ridgetops, on steep side slopes, and in narrow stream drainageways. Slopes range from 8 to 30 percent. The natural vegetation is pine and mixed hardwoods.

Most of the acreage in this map unit is used as woodland. Some small areas have been cleared and are used as pasture and hayland. Some cleared areas have been replanted to pine or have reverted to pine woodland.

This map unit makes up about 1 percent of the survey area. It is about 52 percent Smithdale soils, 36 percent Townley soils, and 12 percent soils of minor extent.

The strongly sloping to moderately steep, deep Smithdale soils are on ridgetops and the upper side slopes. Typically, they have a surface layer of very dark grayish brown sandy loam and a subsoil of red sandy clay loam and sandy loam.

The moderately steep and steep, moderately deep Townley soils are on the middle and lower side slopes. Typically, they have a surface layer of very dark grayish brown silt loam and a subsoil of strong brown clay.

Minor in this map unit are the Nauvoo and Sunlight soils on the lower ridgetops and side slopes and the Mooreville soils along streams and drainageways.

The suitability of the major soils is poor for cultivated crops and fair or poor for pasture and hay. The steepness and irregular shape of the slopes are the main limitations, and erosion is a hazard.

These soils are well suited to woodland. The productivity of the woodland is moderate. The dominant species are oaks, hickories, yellow poplar, and mixed pines. The slope restricts the use of logging and planting equipment and causes a severe hazard of erosion along logging roads and skid trails.

These soils are poorly suited to most urban uses because of slow permeability in the Townley soils, the depth to bedrock, and the slope.

These soils are poorly suited to intensively used recreation areas because of the slope, slow permeability, and small surface stones in some areas. They are well suited to extensive recreation areas.

7. Sipsey-Bankhead

Moderately deep, strongly sloping to very steep, well drained soils that have a loamy subsoil; formed in material weathered from sandstone

This map unit is on strongly sloping to steep, highly dissected side slopes and in narrow drainageways. Slopes range from 8 to 60 percent. The natural vegetation is mixed hardwoods and pine.

Most of the acreage in this map unit is used as woodland. A few small areas have been cleared and are used for pasture. Most areas that have been logged have been replanted to pine.

This map unit makes up about 15 percent of the survey area. It is about 51 percent Sipsey soils, 26 percent Bankhead soils, and 23 percent soils of minor extent.

The strongly sloping to moderately steep Sipsey soils are on the tops of ridges on interstream divides and on the upper side slopes. Typically, they have a surface layer of brown and yellowish brown loamy sand and sandy loam and a subsoil of strong brown sandy clay loam.

The moderately steep to very steep Bankhead soils are on the steeper side slopes. Typically, they have a surface layer of very dark grayish brown sandy loam and a subsoil of brownish yellow and yellowish brown channery and cobbly sandy loam.

Minor in this map unit are the Nauvoo, Nectar, Sunlight, and Townley soils on ridges and side slopes and the Mooreville, Pruitton, Spadra, and Whitwell soils along drainageways.

The major soils are poorly suited to cultivated crops, pasture, and hay. The slope is the main limitation. The shallowness to bedrock restricts root growth, and the soils tend to be droughty.

The suitability for woodland is fair or poor. The productivity of the woodland is low to moderate. The slope restricts harvesting and planting, and the relatively shallow rooting depth and low available water capacity reduce productivity. Erosion is a severe hazard along the logging roads and skid trails.

These soils are poorly suited to urban uses. The slope and the depth to bedrock are the main limitations.

These soils are poorly suited to intensively used recreation areas because of the slope and small surface stones in some areas. They are well suited to extensive recreation areas.

Broad Land Use Considerations

Soil limitations, along with economic, transportation, and location factors, should be considered in making land use decisions. The suitability of soils for different uses should be considered in the development of an area. The general soil map is a helpful source of information for general planning of future growth in the survey area, but it should not be used to select sites for specific uses, such as urban structures. Data about specific soils in areas of this survey can be helpful in planning and making future land use decisions.

The soils in Walker County are generally unsuitable for urban development. In some areas they are suitable, but in most areas the slope, the depth to bedrock, and slow permeability are limitations. The soils on ridgetops in the Sipsey-Nauvoo general soil map unit are better suited to urban uses than the soils in the Sunlight-Townley-Sipsey map unit.

Some areas in the county are better suited to cultivated crops than other areas. The Spadra-Whitwell-Mooreville and the Wynnville-Sipsey-Townley map units generally are suited to cultivated crops, but the flooding is a hazard in the Spadra-Whitwell-Mooreville map unit.

The suitability of the soils in the county for pasture and hay is good to poor. The slope can be a problem, especially in the Sunlight-Townley-Sipsey, Smithdale-Townley, and Sipsey-Bankhead map units. Wetness and the hazard of flooding, mainly during the winter and spring, are problems in the Spadra-Whitwell-Mooreville map unit.

Most of the soils in the county have good or fair potential for woodland. The slope is the main management concern throughout the county.

Some of the map units include soils that are fairly well suited to parks, playgrounds, and other intensive recreation uses. All the map units are well suited to extensive recreation areas.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Allen loam, 4 to 10 percent slopes, is a phase of the Allen series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Nauvoo-Townley complex, 4 to 20 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in the mapped areas are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Nauvoo and Sipsey soils, 6 to 12 percent slopes, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps and are identified by a special symbol on the soil maps.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

AnC—Allen loam, 4 to 10 percent slopes. This deep, well drained, gently sloping and sloping soil is on foot slopes and high stream terraces along the major streams and the Black Warrior River. Slopes are generally smooth and convex. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is dark brown loam about 6 inches thick. The subsurface layer is yellowish brown fine sandy loam about 5 inches thick. The upper part of the subsoil is red sandy clay loam. It extends to a depth of 30 inches. The lower part to a depth of 64 inches is red sandy clay loam and clay loam mottled with brownish yellow, strong brown, and reddish yellow.

Important properties of the Allen soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with this soil in mapping are a few small areas of Montevallo, Nauvoo, Sunlight, Townley, and Whitwell soils. Montevallo, Nauvoo, Sunlight, and Townley soils are on the higher, steeper slopes. Montevallo and Sunlight soils have a higher content of coarse fragments in the subsoil than the Allen soil and are shallow over bedrock. Nauvoo soils have sandstone bedrock at a depth of 40 to 60 inches. Townley soils have a clayey subsoil. The moderately well drained Whitwell soils are in drainageways and on low terraces. Also included are a few small areas of soils that are similar to the Allen soil but have stratified material within a depth of 60 inches, small areas where the surface layer is gravelly, and some areas where much of the original surface layer has been removed and the present surface layer is a mixture of the original surface layer and material from the subsurface layer or subsoil. The included soils make up about 15 percent of this map unit. Individual included areas are generally less than 5 acres in size.

This map unit is used mainly as woodland. A few small areas are used as pasture or cropland.

The suitability of the Allen soil for cultivated crops is fair. The main management concerns are the hazard of erosion and the slope. Measures that can control erosion include minimum tillage, contour farming, suitable cropping systems, and terraces, diversions, and grassed waterways.

This soil is well suited to hay and pasture. The use of equipment is limited by the slope in some areas. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yields.

This soil is well suited to the production of loblolly pine. Other species that grow on this map unit include sweetgum, yellow poplar, and various species of oak and hickory. On the basis of a 50-year site curve, the mean site index for loblolly pine is 80. Loblolly pine can yield 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, blackberry, greenbrier, and flowering dogwood.

Plant competition is the major concern in managing timber on this map unit. It hinders tree growth and can prevent adequate reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning. Erosion is a hazard in some areas, especially along logging roads and skid trails. Management should include measures that control erosion, such as water bars, drainage dips, and a protective cover of vegetation. Site preparation methods that minimize surface disturbance are needed.

The suitability of this soil for urban development is only fair, mainly because of the slope, the moderate permeability, and a limited load-supporting capacity. In the steeper areas the slope is a moderate or severe limitation affecting many uses. As a result, the less sloping sites should be selected for most uses or excavation and land shaping are needed. The moderate permeability is a limitation on sites for septic tank absorption fields. In most areas increasing the size of the absorption field helps to overcome this limitation. Properly designing buildings and roads helps to offset the limited load-supporting capacity. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed.

This soil has good potential for openland and woodland wildlife habitat and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting desirable vegetation, maintaining the existing plant cover, or promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. The wetland wildlife habitat can be improved by constructing shallow ponds, which provide areas of open water for waterfowl and furbearers.

This soil is well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily. Measures that prevent crusting and compaction are needed when soil material is reapplied to surface-mined areas. If vegetation is to be established, applications of plant nutrients, fertilizer, and lime, the recommended plant seeds or seedlings, and adequate seedbed preparation are needed.

The capability subclass is IIIe, and the woodland suitability group is 8A.

BaE—Bankhead-Rock outcrop complex, 15 to 60 percent slopes. This map unit occurs as areas of a moderately deep, well drained, moderately steep to very steep Bankhead soil on narrow, winding ridgetops and highly dissected side slopes and areas of Rock outcrop occurring as rock bluffs and outcrops on the steep side slopes above the major drainageways or at the head of

large ravines. Slopes are short and are complex and convex. Individual areas are irregular in shape and range from 200 to 800 acres in size. They are 45 to 60 percent Bankhead soil and 20 to 30 percent Rock outcrop. The Bankhead soil and Rock outcrop occur as areas so small and so intricately mixed that mapping them separately is not practical at the selected scale.

Typically, the Bankhead soil has a surface layer of very dark grayish brown sandy loam about 4 inches thick. The upper part of the subsoil is brownish yellow channery sandy loam. It extends to a depth of 13 inches. The lower part is yellowish brown cobbly sandy loam. It extends to a depth of 26 inches. It is underlain by fractured, hard, level-bedded sandstone.

Important properties of the Bankhead soil—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

The Rock outcrop occurs as exposures of hard sandstone bedrock that range from a few feet to several feet in diameter or as rock bluffs on steep side slopes. The bluffs are 5 to more than 30 feet above ground level.

Included in mapping are many small areas of Nauvoo, Nectar, Sipsey, Sunlight, and Townley soils. Nauvoo, Nectar, Sipsey, and Townley soils are more clayey in the subsoil than the Bankhead soil and are deeper over bedrock. They are on the less sloping ridgetops, upper side slopes, and benches. Sunlight soils are not so deep as the Bankhead soil. They are in positions on side slopes similar to those of the Bankhead soil. Also included are soils that are similar to the Bankhead soil but are less than 20 inches deep over bedrock or have more than 35 percent sandstone fragments and soils that have a deep, yellowish brown, loamy subsoil and are on colluvial slopes. The included soils make up about 30 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Nearly all of the acreage is wooded with mixed hardwoods and pine. This map unit is unsuited to cultivated crops and pasture because of the slope and the Rock outcrop.

The Bankhead soil is suited to the production of loblolly pine and longleaf pine. Other species that grow on this map unit include various species of oak and bigleaf magnolia. On the basis of a 50-year site curve, the mean site index for loblolly pine is 80. Loblolly pine can yield 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly dewberry, flowering dogwood, huckleberry, and bluestem.

The major concerns in managing timber on the Bankhead soil are the hazard of erosion, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition. Management should include measures that control erosion, such as water bars, drainage dips, and a protective cover of vegetation. Site preparation methods that minimize surface disturbance are needed. The slope restricts the use of equipment. Tracked equipment can be used on the steeper slopes. Management measures should be applied only when the content of soil moisture is suitable. Droughtiness and the depth to bedrock increase the seedling mortality rate. This rate can be partly offset by increasing the number of seedlings that are planted. Windthrow is a hazard because of the depth to bedrock. Heavy thinning should be avoided. Plant competition hinders tree growth and can prevent adequate reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

The Bankhead soil is poorly suited to urban development because of the slope and the depth to bedrock. Any excavations needed during construction can expose the bedrock. Erosion is a hazard. Only the part of the site that is used for construction should be disturbed. The slope limits the installation of septic tank absorption fields. The absorption lines should be installed on the contour. Properly designing access roads helps to control surface runoff and stabilize cut slopes.

This map unit has very poor potential for openland, woodland, and wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting desirable vegetation, maintaining the existing plant cover, or promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. Management efforts should be concentrated in the less sloping areas.

The Bankhead soil and the Rock outcrop are poorly suited to the reclamation of surface-mined areas. Because of the slope and large stones, stockpiling topsoil is difficult. Erosion is a serious hazard because of the content of sand in the Bankhead soil. Surface-mined areas should be mulched and seeded as soon as

possible after soil material is reapplied to the surface.

The Bankhead soil is in capability subclass VIIe and in woodland suitability group 8R. The Rock outcrop is not assigned a capability subclass or a woodland suitability group.

BcE—Brilliant extremely channery loam, 6 to 40 percent slopes. This deep, somewhat excessively drained, sloping to very steep soil is in areas where strip-mining has uncovered and redeposited deep sediments derived from sandstone, siltstone, and shale. These areas have been reclaimed and have long, smooth slopes. Individual areas are long and narrow on ridges or are large, broad areas. They range from 40 to 600 acres in size.

Typically, the surface layer is grayish brown extremely channery loam about 7 inches thick. The underlying material to a depth of 84 inches or more is dark gray extremely channery loam. Large boulders can occur throughout the soil.

Important properties of the Brilliant soil—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Medium acid to neutral
Organic matter content: Very low
Natural fertility: High to low
Depth to bedrock: More than 6 feet
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with this soil in mapping are small areas of Palmerdale soils, areas where the original soil material has been stockpiled and replaced on the surface, and small areas of most of the other soils in the survey area, which are adjacent to the reclaimed areas. Also included are small areas of soils that have a pH of more than 8.0. These soils are especially in areas where mining has extended to a greater depth. The included soils and areas of high walls make up about 10 percent of this map unit. Individual included areas are generally less than 5 acres in size.

The reclaimed areas are planted to grasses and legumes, which help to control erosion, and later are replanted to pine trees. Most plant nutrients, except for nitrogen, are available in the amounts needed for plant growth.

This soil is suited to pasture and hay (fig. 3) but is unsuited to most cultivated crops. The suitability is limited because of excessive amounts of rock fragments, the low available water capacity, and the slope. The hazard of erosion is very severe, especially when soil material is redeposited during reclamation. The degree of reclamation has important effects on the suitability for future land uses.

This soil is well suited to the production of loblolly pine. Other species that grow on this map unit include sycamore, Virginia pine, eastern cottonwood, royal paulownia, and eastern redcedar. On the basis of a 50-year site curve, the mean site index for loblolly pine is 85. Loblolly pine can yield 120 cubic feet, or 600 board feet, per acre per year, as measured when the mean annual increment culminates. Areas where the pH value is more than 6.5 cannot support pine trees and should be planted to other tree species. The understory in areas where vegetative reclamation has not occurred is mainly spiny amaranth, little barley, common lambsquarters, sumac, and broom sedge.

The main concerns in managing timber on this map unit are the hazard of erosion, the equipment limitation, and seedling mortality. Erosion is especially severe when topsoil is replaced on the surface of bare areas. Management should include measures that control erosion, such as water bars, drainage dips, and a protective cover of vegetation. Conventional methods of harvesting trees can be used in the more gently sloping areas, but the steeper slopes restrict the use of equipment. Tracked equipment can be used on the steeper slopes. Droughtiness, which is caused by the large number of coarse fragments in the soil, increases the seedling mortality rate. This rate can be partly offset by increasing the number of seedlings that are planted. Rocks on the surface can interfere with harvesting and planting.

This soil is poorly suited to urban development. The main limitations are the slope, large stones, and unstable fill.

This soil has poor potential for openland wildlife habitat, fair potential for woodland wildlife habitat, and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting desirable vegetation or maintaining the existing plant cover. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. Isolated areas may be suitable for the construction of shallow water areas, which improve the wetland wildlife habitat.

The capability subclass is VIIs, and the woodland suitability group is 8R.

BPE—Brilliant and Palmerdale extremely channery loams, 6 to 60 percent slopes. These deep, somewhat excessively drained, sloping to very steep soils are in areas of unreclaimed or partly reclaimed surface-mine spoil deposits. They are in the older, shallow strip-

Figure 3.—Hay ready for harvest in an area of Brilliant extremely channery loam, 6 to 40 percent slopes.

mining areas where deep sediments derived from sandstone, siltstone, and shale have been uncovered and redeposited. Slopes generally are short and very complex. Short, steep side slopes, high walls (fig. 4), and water-filled pits are common. The more recent areas of mine spoil have longer, smoother slopes with or without high walls and water-filled pits. Individual areas are long and narrow on ridges with very steep side slopes or are large, broad areas. They range from 40 to more than 300 acres in size. They are about 60 percent Brilliant soil and 30 percent Palmerdale soil. The two soils occur as areas so small and so intricately mixed that mapping them separately is not practical at the selected scale.

Typically, the Brilliant soil has a surface layer of grayish brown extremely channery loam about 5 inches thick. The underlying material to a depth of 60 inches or more is dark grayish brown extremely channery loam. Large boulders can occur throughout the soil.

Important properties of the Brilliant soil—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Medium acid to moderately alkaline
Organic matter content: Very low
Natural fertility: High to low
Depth to bedrock: More than 6 feet
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Typically, the Palmerdale soil is grayish brown extremely channery loam throughout. The surface layer is about 6 inches thick, and the underlying material extends to a depth of 60 inches or more.

Important properties of the Palmerdale soil—

Permeability: Moderately rapid
Available water capacity: Low

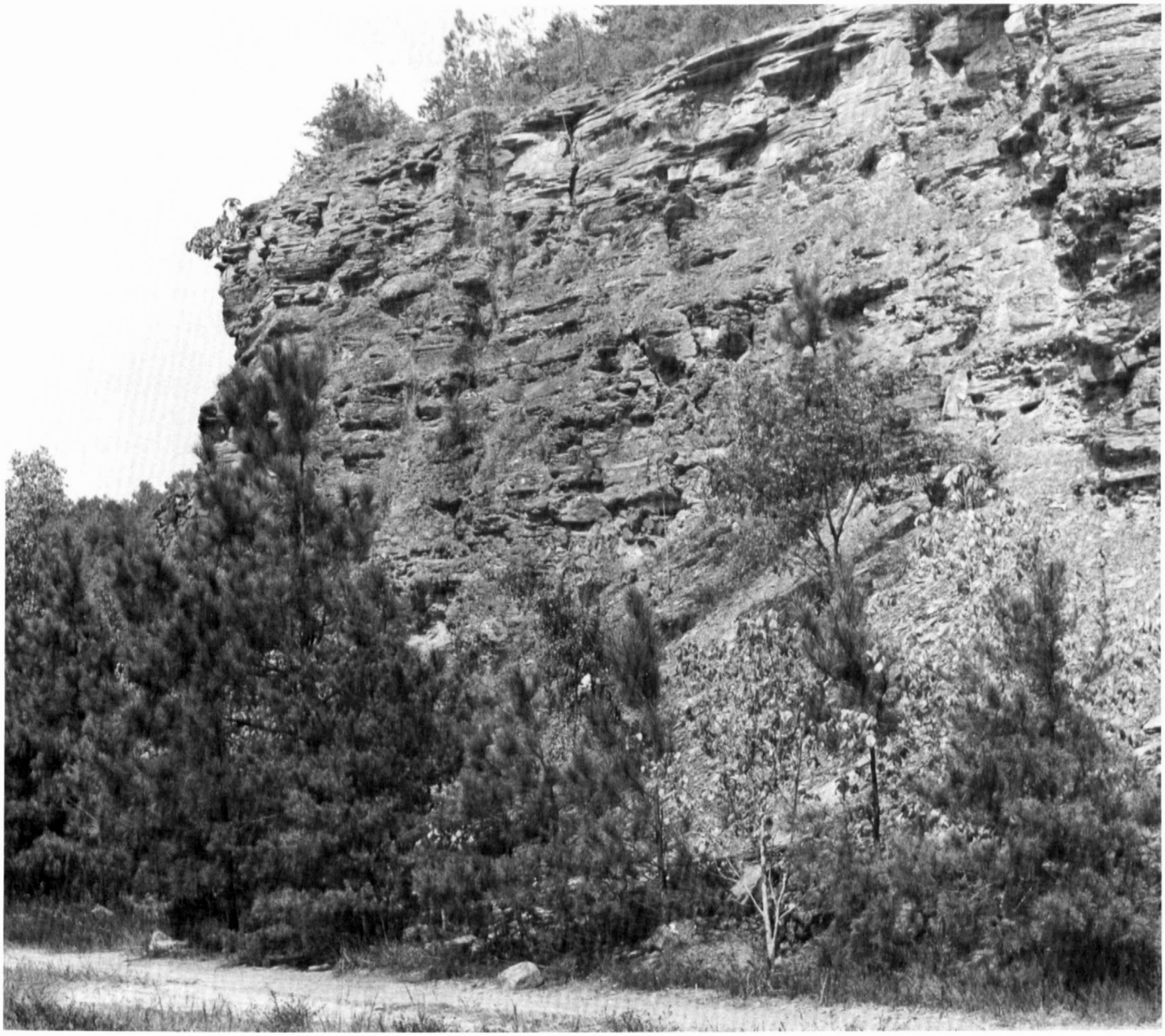

Figure 4.—A high wall resulting from surface mining in an area of Brilliant and Palmerdale extremely channery loams, 6 to 60 percent slopes.

Soil reaction: Extremely acid to strongly acid
Organic matter content: Very low
Natural fertility: High to low
Depth to bedrock: More than 6 feet
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with these soils in mapping are small areas of most of the other soils in the survey area, which are adjacent to the mined areas. Also included are small areas of soils that have a pH of more than 8.0. These soils are in areas where mining has extended to a great depth. The included soils and areas of escarpments, high walls, and bedrock outcrop make up about 10

percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most of the acreage in this map unit is woodland or idle land. The unit generally supports mixtures of annual and perennial grasses and varying amounts of pine and hardwoods. Some of the older reclaimed areas are planted to grasses and legumes, which help to control erosion, and later are replanted to pine trees. Most plant nutrients, except for nitrogen, are available in the amounts needed for plant growth.

These soils are poorly suited to pasture and are unsuited to cultivated crops. The suitability is limited because of excessive amounts of rock fragments, the low available water capacity, and the slope. The hazard of erosion is very severe, especially when soil material is redeposited during surface-mine reclamation.

The suitability of these soils for the production of loblolly pine is fair or good. Other species that grow on this map unit include sycamore, Virginia pine, eastern cottonwood, royal paulownia, and eastern redcedar. On the basis of a 50-year site curve, the mean site index for loblolly pine is 85. Loblolly pine can yield 120 cubic feet, or 600 board feet, per acre per year, as measured when the mean annual increment culminates. Areas where the pH value is more than 6.5 cannot support pine trees and should be planted to other tree species. The understory vegetation is mainly honeysuckle, sumac, Pennsylvania smartweed, spiny amaranth, common lambsquarters, broom sedge, and little barley.

The main concerns in managing timber on this map unit are the hazard of erosion, the equipment limitation, and seedling mortality. Erosion is especially severe when topsoil is replaced on the surface of bare areas. Management should include measures that control erosion, such as water bars, drainage dips, and a protective cover of vegetation. Conventional methods of harvesting trees can be used in the more gently sloping areas, but the steeper slopes restrict the use of equipment. Tracked equipment can be used on the steeper slopes. Droughtiness, which is caused by the large number of coarse fragments in the soils, increases the seedling mortality rate. This rate can be partly offset by increasing the number of seedlings that are planted. Rocks on the surface can interfere with harvesting and planting.

These soils are poorly suited to urban development. The main limitations are the slope, large stones, and unstable fill.

These soils have poor potential for openland wildlife habitat, fair potential for woodland wildlife habitat, and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting desirable vegetation or maintaining the existing plant cover. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. Small, isolated areas may be suitable for the construction of shallow water areas, which improve the wetland wildlife habitat.

The capability subclass is VIIs, and the woodland suitability group is 8R.

McE—Montevallo channery silt loam, 30 to 60 percent slopes. This shallow, well drained, very steep soil is on side slopes and narrow ridgetops in the uplands. Slopes are complex and convex. Individual areas are irregular in shape and range from 40 to 400 acres in size.

Typically, the surface layer is dark yellowish brown channery silt loam about 3 inches thick. The upper part of the subsoil is yellowish brown very channery loam. It extends to a depth of 5 inches. The lower part is strong brown extremely channery loam. It extends to a depth of 12 inches. It is underlain by yellowish brown, weathered, fractured siltstone and sandstone.

Important properties of the Montevallo soil—

Permeability: Moderate
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 10 to 20 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with this soil in mapping are small areas of Nauvoo, Nectar, Sipsey, Sunlight, and Townley soils. Nauvoo, Nectar, and Townley soils have a subsoil that is thicker than that of the Montevallo soil. They are on the narrow, less sloping ridgetops. Sipsey soils have a subsoil that is thicker than that of the Montevallo soil and do not have so many coarse fragments. Sunlight soils have a subsoil that is better developed than that of the Montevallo soil. Sipsey and Sunlight soils are in positions on side slopes similar to those of the Montevallo soil. The included soils make up about 15 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Almost all of the acreage is wooded. The Montevallo soil is unsuited to pasture and cultivated crops. The slope, the hazard of erosion, and the droughtiness, caused by the depth to bedrock and the fragments in the soil, are severe limitations affecting these uses. The

short, irregular, complex slopes of this unit limit equipment use for both cultivated crops and pasture and hay management.

This soil is fairly well suited to the production of loblolly pine. Other species that grow on this map unit include Virginia pine and various species of oak. On the basis of a 50-year site curve, the mean site index for loblolly pine is 70. Loblolly pine can yield 93 cubic feet, or 465 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, blackberry, huckleberry, and bluestem.

The major concerns in managing timber on this map unit are the hazard of erosion, the equipment limitation, seedling mortality, and the windthrow hazard. Management should include measures that control erosion, such as water bars, drainage dips, and a protective cover of vegetation. Site preparation methods that minimize surface disturbance are needed. The slope restricts the use of equipment. Tracked equipment can be used on the steeper slopes. Management measures should be applied only when the content of soil moisture is suitable. Droughtiness, which is caused by the shallowness and the coarse fragments throughout the soil, increases the seedling mortality rate. This rate can be partly offset by increasing the number of seedlings that are planted. Windthrow is a hazard because of the limited rooting depth. Heavy thinning should be avoided.

This soil is poorly suited to urban development. The slope and the depth to bedrock are the main concerns, especially in installing septic tank absorption fields and in building roads. Any excavations during construction can expose siltstone, sandstone, or shale bedrock. Erosion is a hazard. Only the part of the site that is used for construction should be disturbed.

This soil has poor potential for openland wildlife habitat, fair potential for woodland wildlife habitat, and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting appropriate vegetation, maintaining the existing plant cover, or promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. In some areas the soil is suitable for the construction of shallow ponds, which improve the habitat for waterfowl and furbearers.

This soil is poorly suited to the reclamation of surface-mined areas. Because of an inadequate amount of soil material and the slope, topsoil reclamation is very difficult. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is VIIe, and the woodland suitability group is 6R.

MoA—Mooreville silt loam, 0 to 1 percent slopes, frequently flooded. This deep, moderately well drained, nearly level soil is on flood plains (fig. 5). Slopes are smooth and slightly convex. Individual areas are mostly long and narrow and parallel the streams. They range from 10 to 60 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The upper part of the subsoil is mottled yellowish brown loam about 9 inches thick. The lower part is loam mottled in shades of gray and brown. It extends to a depth of 45 inches. It is underlain to a depth of 60 inches by mottled gray and yellowish brown clay loam.

Important properties of the Mooreville soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderately low
Natural fertility: Medium
Depth to bedrock: More than 6 feet
Root zone: Same as depth to bedrock
Depth to the water table: 1.5 to 3.0 feet, from January through March
Flooding: Frequent, from January through March

Included with this soil in mapping are small areas of Pruitton, Spadra, and Whitwell soils. Also included are a few small areas of sandy soils on natural levees, soils that are similar to the Mooreville soil but are more poorly drained, and a few small areas that remain ponded for 3 to 4 months. Pruitton and Spadra soils are well drained. Pruitton soils are at the higher elevations on the flood plains, and Spadra soils are on the higher terraces. Whitwell soils have a subsoil that is yellowish and is better developed than that of the Mooreville soil. They are on low terraces. The included soils make up about 20 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most of the acreage in this map unit is woodland. Scattered small areas are used as pasture or cropland.

This soil is fairly well suited to pasture but is poorly suited to most cultivated crops. The frequent flooding and the wetness are the main management concerns. Surface and subsurface drainage systems can reduce the wetness, and some late-season crops could be grown. Pasture plants respond well to the application of plant nutrients. The soil is better suited to warm-season

Figure 5.—An area of Mooreville silt loam, 0 to 1 percent slopes, frequently flooded.

pasture and hay species than to other forage species. Controlled grazing during periods of flooding or excessive wetness helps to prevent compaction and destruction of the sod.

This soil is well suited to the production of loblolly pine and yellow poplar. Other species that grow on this map unit include sweetgum and water oak. On the basis of a 50-year site curve, the mean site index for loblolly pine is 100. Loblolly pine can yield 154 cubic feet, or 770 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, blackberry, poison ivy, and bluestem.

The major concerns in managing timber on this map unit are the equipment limitation, the seedling mortality rate, and plant competition. The seasonal high water table and the flooding restrict the use of equipment to periods when the soil is dry. Management measures should be applied only when the content of soil moisture is suitable. The flooding and the seasonal high water table increase the seedling mortality rate. A surface drainage system and, in some areas, bedding can increase the seedling survival rate. Plant competition hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

This soil is unsuited to most kinds of urban development and industrial uses. The flooding and the wetness are the major limitations. Overcoming these limitations is difficult, especially on sites for sanitary facilities. Properly designing streets or roads helps to

offset the limited load-supporting capacity of the soil.

This soil has fair potential for openland wildlife habitat, good potential for woodland wildlife habitat, and poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting appropriate vegetation, maintaining the existing plant cover, or promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer and turkeys. The burning should be rotated among several small tracts. The wetland wildlife habitat can be improved by constructing shallow ponds, which provide areas of open water for waterfowl and furbearers.

This soil is poorly suited to the reclamation of surface-mined areas. An adequate amount of soil material and the nearly level topography are beneficial during reclamation. The long, narrow shape of the areas, however, is a problem, and the flooding and wetness prevent working throughout the year. Also, access is limited in some areas.

The capability subclass is Vw, and the woodland suitability group is 11W.

MsA—Mooreville frequently flooded-Spadra occasionally flooded complex, 0 to 3 percent slopes. These deep, moderately well drained and well drained, nearly level and gently sloping soils are on flood plains and low stream terraces. Slopes are smooth and are slightly convex and concave. Individual areas are generally long and fairly broad and parallel the major streams. They range from 20 to 100 acres in size. They are about 45 percent Mooreville soil and 40 percent Spadra soil. The two soils occur as areas so intricately mixed and so small that mapping them separately is not practical at the selected scale.

Typically, the Mooreville soil has a surface layer of brown silt loam about 6 inches thick. The upper part of the subsoil is yellowish brown, mottled loam. It extends to a depth of 10 inches. The lower part is mottled gray and brown loam. It extends to a depth of 40 inches. It is underlain to a depth of 62 inches by mottled gray and brown sandy clay loam.

Important properties of the Mooreville soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Organic matter: Moderately low
Natural fertility: Medium
Depth to bedrock: More than 6 feet
Root zone: Same as depth to bedrock
Depth to the water table: 1.5 to 3.0 feet, from January through March
Flooding: Frequent, from January through March

Typically, the Spadra soil has a surface layer of dark yellowish brown fine sandy loam about 7 inches thick. The subsoil is loam throughout. The upper part is dark brown. It extends to a depth of 21 inches. The lower part is mottled dark yellowish brown and dark brown. It extends to a depth of 55 inches. It is underlain to a depth of 62 inches by dark yellowish brown sandy loam.

Important properties of the Spadra soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid to medium acid
Organic matter content: Moderate
Natural fertility: Medium
Depth to bedrock: More than 6 feet
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: Occasional, from December through April

Included with these soils in mapping are small areas of the moderately well drained Whitwell soils at the lower elevations on terraces, small areas of soils that are similar to the Spadra soil but have a silty subsoil, and well drained, sandy soils adjacent to streams. Also included are a few small areas of soils that may be ponded for 3 to 4 months. The included soils make up about 15 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most of the acreage is used as pasture or woodland. Some areas of the Spadra soil are used for cultivated crops (fig. 6).

The Spadra soil is well suited to cultivated crops, especially in the large areas along the Black Warrior River below Lewis Smith Dam. These areas are not often flooded, and then only briefly. A drainage system is needed if the Mooreville soil is cultivated. The wetness of this soil delays tillage and planting in most years. The main limitations are the flooding and the wetness. The use of equipment is restricted during wet periods.

The Spadra soil is well suited to hay and pasture. A drainage system is needed to remove excessive surface and subsurface water from the Mooreville soil during wet periods. The main limitations are the flooding and the wetness. Plants respond well to the application of fertilizer and lime. The use of equipment is restricted during wet periods. Restricted grazing during these periods helps to prevent compaction and destruction of the sod.

Figure 6.—Soybeans in an area of Mooreville frequently flooded-Spadra occasionally flooded complex, 0 to 3 percent slopes.

These soils are well suited to the production of loblolly pine and yellow poplar. Other species that grow on this map unit include blackgum, water oak, sycamore, willow, and sweetgum. On the basis of a 50-year site curve, the mean site index for loblolly pine is 100 on the Mooreville soil and 95 on the Spadra soil. Loblolly pine can yield 154 cubic feet, or 770 board feet, per acre per year on the Mooreville soil and 142 cubic feet, or 710 board feet, per acre per year on the Spadra soil, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, greenbrier, blackberry, poison ivy, flowering dogwood, and bluestem.

The main concerns in managing timber on this map unit are the equipment limitation, seedling mortality, and plant competition. The seasonal high water table restricts the use of equipment to periods when the Mooreville soil is dry. Management measures should be applied only when the content of soil moisture is suitable. The flooding and the seasonal high water table increase the seedling mortality rate on the Mooreville soil. A surface drainage system and, in some areas, bedding can increase the seedling survival rate. Plant competition hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

These soils are unsuited to urban and industrial development. The major management concerns are the flooding on both soils and the wetness and low strength in the Mooreville soil. Overcoming these limitations is difficult. Properly designing streets and roads helps to offset the limited load-supporting capacity of the Mooreville soil.

These soils have fair or good potential for openland wildlife habitat, good potential for woodland wildlife habitat, and poor or very poor potential for wetland wildlife habitat. The wildlife habitat can be improved by planting appropriate vegetation, maintaining the existing plant cover, or promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. The wetland wildlife habitat can be improved by constructing shallow ponds, which provide areas of open water for waterfowl and furbearers.

These soils are well suited, fairly well suited, or poorly suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily on the Spadra soil. Because of the seasonal wetness, stockpiling is difficult on the Mooreville soil. Measures that prevent crusting are needed. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The Mooreville soil is in capability subclass Vw and in woodland suitability group 11W. The Spadra soil is in capability subclass IIw and in woodland suitability group 10A.

NaE—Nauvoo-Townley complex, 4 to 20 percent slopes. These deep and moderately deep, well drained, gently sloping to moderately steep soils are on narrow ridgetops and on side slopes. The Nauvoo soil is generally on the higher, less sloping ridgetops and upper side slopes, and the Townley soil is on the lower ridges and side slopes. Slopes are short and are complex and generally convex. Individual areas are irregular in shape, generally conforming to the shape of the ridge, and range from 20 to 60 acres in size. They are about 50 percent Nauvoo soil and 45 percent Townley soil. The two soils occur as areas so small and so intricately mixed that mapping them separately is not practical at the selected scale.

Typically, the Nauvoo soil has a surface layer of dark yellowish brown fine sandy loam about 4 inches thick. The upper part of the subsoil is red and yellowish red clay loam and sandy clay loam. It extends to a depth of 33 inches. The lower part is mottled yellowish red and strong brown fine sandy loam. It extends to a depth of 40 inches. It is underlain by level-bedded, weathered sandstone.

Important properties of the Nauvoo soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 40 to 60 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Typically, the Townley soil has a surface layer of dark grayish brown silt loam about 5 inches thick. The subsoil is yellowish red silty clay. It extends to a depth of 31 inches. It is underlain by weathered siltstone or fine grained sandstone.

Important properties of the Townley soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with these soils in mapping are small areas of Montevallo, Nectar, Sipsey, and Sunlight soils. The shallow Montevallo and Sunlight soils have many coarse fragments. They are on the steeper side slopes. Nectar soils have a clayey subsoil and are underlain by sandstone bedrock. They are in the same landscape position as the Nauvoo soil. Sipsey soils have a yellow subsoil. They are on side slopes. Also included are areas where the surface layer is a mixture of the original surface layer and the subsoil, areas where all of the original surface layer has been removed and rills or shallow gullies are common, and small areas where sandstone crops out. The included soils make up about 5 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most areas are wooded. A few areas are used for pasture or homesite development.

These soils are poorly suited to cultivated crops. The use of equipment is limited by the gently sloping to moderately steep, short, complex slopes. If the soils are used for cultivated crops, the erosion hazard is moderate or severe. Measures that control erosion include contour farming, minimum tillage, approved cropping systems, and terraces, diversions, and grassed waterways.

These soils are fairly well suited to grasses and legumes for hay and pasture. Rotation grazing, weed control, and the application of plant nutrients are needed for maximum forage quality and yields.

These soils are well suited to the production of loblolly pine. Other species that grow on this map unit include longleaf pine, Virginia pine, sweetgum, and

various species of oak and hickory. On the basis of a 50-year site curve, the mean site index for loblolly pine is 85 on the Nauvoo soil and 80 on the Townley soil. Loblolly pine can yield 120 cubic feet, or 600 board feet, per acre per year on the Nauvoo soil and 110 cubic feet, or 550 board feet, per acre per year on the Townley soil, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, blackberry, flowering dogwood, and bluestem.

The major concerns in managing timber on this map unit are the hazard of erosion, the equipment limitation, the windthrow hazard, and plant competition. Management should include measures that control erosion, such as water bars, drainage dips, and a protective cover of vegetation. Site preparation methods that minimize surface disturbance are needed. Roads and landings can be protected against erosion by constructing diversions and by seeding disturbed areas. Conventional methods of harvesting trees can be used in the more gently sloping areas but are difficult to use in the steeper areas. The clayey subsoil of the Townley soil restricts the use of wheeled equipment during wet periods. Most planting and harvesting equipment should be used during dry periods. Windthrow is a hazard on the Townley soil because of the depth to bedrock. Heavy thinning should be avoided. Plant competition hinders tree growth and can prevent adequate reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

These soils are poorly suited to urban development. The slope, the slow permeability, and the depth to bedrock limit the installation of septic tank absorption fields. The absorption lines should be installed on the contour. The absorption fields commonly do not function properly because of the slow permeability in the Townley soil. In some areas the slow permeability can be overcome by increasing the size of the absorption field. Any excavations during construction can expose shale, siltstone, or sandstone bedrock. Properly designing buildings and roads helps to offset the limited load-supporting capacity of the Townley soil and helps to prevent the damage caused by shrinking and swelling. Erosion is a hazard. Only the part of the site that is used for construction should be disturbed. Disturbed areas should be revegetated as soon as construction activities are completed.

These soils have good potential for openland and woodland wildlife habitat and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable vegetation, maintaining the existing plant cover, or promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. The wetland wildlife habitat can be improved by constructing shallow ponds, which provide areas of open water for waterfowl and furbearers.

These soils are fairly well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily, but care is needed on the steeper slopes. Measures that prevent crusting and compaction are needed. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is VIe. The Nauvoo soil is in woodland ordination group 9A, and the Townley soil is in woodland ordination group 8R.

NcC—Nauvoo-Sipsey-Urban land complex, 2 to 12 percent slopes. This map unit consists of gently sloping to strongly sloping areas of a deep, well drained Nauvoo soil on ridgetops; a moderately deep, well drained Sipsey soil on side slopes; and Urban land. Slopes are smooth and complex. Individual areas are irregular in shape and conform somewhat to the natural landscape. They range from 10 to 100 acres in size. They are about 35 percent Nauvoo soil, 30 percent Sipsey soil, and 25 percent Urban land. The two soils and Urban land occur as areas so small and so intricately mixed that mapping them separately is not practical at the selected scale.

Typically, the Nauvoo soil has a surface layer of dark brown fine sandy loam about 5 inches thick. The upper part of the subsoil is yellowish red sandy clay loam. It extends to a depth of 16 inches. The next part is red clay loam. It extends to a depth of 32 inches. The lower part is yellowish red, mottled sandy clay loam. It extends to a depth of 45 inches. It is underlain by brown, yellow, and red, level-bedded, weathered sandstone.

Important properties of the Nauvoo soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 40 to 60 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Typically, the Sipsey soil has a surface layer of brown sandy loam about 4 inches thick. The subsurface layer is yellowish brown sandy loam. It extends to a

depth of 12 inches. The subsoil is strong brown sandy clay loam. It extends to a depth of 31 inches. It is underlain by soft, massive sandstone.

Important properties of the Sipsey soil—

Permeability: Moderate
Available water capacity: Low
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Urban land occurs as areas covered by buildings, sidewalks, driveways, streets, parking lots, and other structures that so obscure or alter the soils that identification of the soil series is not feasible.

Included in mapping are small areas of Bankhead, Nectar, Townley, and Whitwell soils. Bankhead soils have a loamy, yellowish and brownish subsoil that has many coarse fragments. They are on the steeper side slopes. Nectar and Townley soils have a clayey subsoil. They are on ridges and the upper side slopes. Whitwell soils are moderately well drained and are on foot slopes and adjacent to narrow flood plains. Also included are areas that have been graded, filled, and shaped. The included soils make up about 10 percent of this map unit. Individual included areas are generally less than 5 acres in size.

The suitability of this map unit for homesite and urban development is fair. The main limitations are the moderate permeability, the depth to bedrock, and the slope. In some areas, septic tank absorption fields do not function properly because of the moderate permeability and the depth to bedrock. These limitations can be overcome by increasing the size of the absorption field. The absorption lines should be installed on the contour. Erosion is a hazard, especially in the more sloping areas. Properly designing access roads helps to control surface runoff and stabilize cut slopes. Only the part of the site that is used for construction should be disturbed. Properly designing roads helps to offset the limited load-supporting capacity of some of the included soils. The risk of corrosion is low on uncoated steel and high on concrete.

Plans for homesite development should provide for the preservation of as many trees as possible. When the site is landscaped, removal of surface coarse fragments or applications of topsoil to disturbed areas are required for the best results, particularly in areas used for lawns. A plant cover can be established and maintained through proper applications of fertilizer, seeding, mulching, and shaping of the slopes.

This map unit is not assigned a capability subclass or a woodland suitability group.

NnB—Nauvoo and Nectar fine sandy loams, 2 to 6 percent slopes. These deep, well drained, gently sloping soils are on ridgetops and the upper side slopes. Slopes are smooth and convex. Individual areas are irregular in shape and range from 10 to 50 acres in size. They are about 50 percent Nauvoo soil and 35 percent Nectar soil. Each soil is in areas large enough to be mapped separately. Because of their present and expected use and their similarity, however, they were not mapped separately. Most mapped areas have both of these soils, but a few areas may have only one of them.

Typically, the Nauvoo soil has a surface layer of dark yellowish brown fine sandy loam about 4 inches thick. The upper part of the subsoil is red clay loam. It extends to a depth of 25 inches. The next part is yellowish red sandy clay loam. It extends to a depth of 33 inches. The lower part is mottled yellowish red and strong brown fine sandy loam. It extends to a depth of 42 inches. The substratum to a depth of 60 inches is level-bedded, weathered sandstone.

Important properties of the Nauvoo soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 40 to 60 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Typically, the Nectar soil has a surface layer of dark brown fine sandy loam about 5 inches thick. The upper part of the subsoil is yellowish red clay. It extends to a depth of 16 inches. The next part is red clay loam. It extends to a depth of 32 inches. The lower part is mottled yellowish red sandy clay loam. It extends to a depth of 45 inches. The substratum to a depth of 60 inches is red, yellow, and brown, level-bedded, weathered sandstone.

Important properties of the Nectar soil—

Permeability: Moderately slow
Available water capacity: Moderate
Soil reaction: Extremely acid or very strongly acid
Organic matter content: Low
Natural fertility: Low

Depth to bedrock: 40 to 60 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included in mapping are small areas of Sipsey, Townley, and Wynnville soils. Sipsey soils have a yellowish and brownish subsoil. They are on side slopes. They are shallower over bedrock than the Nauvoo and Nectar soils. Townley soils have a clayey subsoil and are underlain by siltstone and shale. They are on the lower ridges and the upper side slopes. Wynnville soils have a fragipan. They are in the lowest position on the landscape. Also included are some areas where the surface layer is a mixture of the original surface layer and the subsoil, areas where all of the original surface layer has been removed and rills and shallow gullies are common, and soils that are similar to the Nauvoo soil but are less than 20 inches deep over soft sandstone bedrock. The included soils make up about 15 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most areas are used for pasture or woodland. A few small areas are used for cultivated crops or homesite development.

These soils are well suited to cultivated crops. The main limitations are the slope and the hazard of erosion. Measures that can control erosion include terraces, diversions, grassed waterways, minimum tillage, contour farming, and suitable cropping systems. Returning crop residue to the soil improves tilth and increases the content of organic matter.

These soils are well suited to pasture and hay (fig. 7). Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yields.

These soils are well suited to the production of loblolly pine. Other species that grow on this map unit include sweetgum, Virginia pine, and longleaf pine. On the basis of a 50-year site curve, the mean site index for loblolly pine is 85. Loblolly pine can yield 120 cubic feet, or 600 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, greenbrier, blackberry, flowering dogwood, and bluestem.

Plant competition is the major concern in managing timber on this map unit. It hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning. Erosion is a hazard in some areas, especially along logging roads and skid trails. Management should include measures that control erosion, such as water bars and revegetation of disturbed areas.

The suitability of this map unit for urban development is poor. The main limitations are the depth to bedrock, the moderate or moderately slow permeability, a moderate shrink-swell potential, and low strength. Any excavations needed during construction can expose the bedrock. On sites for septic tank absorption fields, the restricted permeability can generally be overcome by increasing the size of the absorption field. Properly designing buildings and roads helps to offset the limited load-supporting capacity and the shrink-swell potential of the Nectar soil.

This map unit has good potential for both openland and woodland wildlife habitat and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting the desired seed and forage crops, maintaining the existing plant cover, or promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. Some areas are suitable for the construction of shallow ponds, which provide areas of open water for waterfowl and furbearers.

These soils are well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily. This map unit is considered prime farmland; thus, the various soil layers should be removed and stored separately so that they can be replaced in their original sequence. Measures that prevent crusting and compaction are needed. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is IIe, and the woodland suitability group is 9A.

NSC—Nauvoo and Sipsey soils, 6 to 12 percent slopes. These deep and moderately deep, well drained, gently sloping and sloping soils are on ridgetops. Slopes are smooth and convex. Individual areas are irregular in shape and range from 40 to 200 acres in size. They are about 50 percent Nauvoo soil and 40 percent Sipsey soil. Each soil is in areas large enough to be mapped separately. Because of their present and expected use, however, they were not mapped separately. Most mapped areas have both of these soils, but a few areas may have only one of them.

Typically, the Nauvoo soil has a surface layer of dark yellowish brown fine sandy loam about 4 inches thick.

Figure 7.—An area of Nauvoo and Nectar fine sandy loams, 2 to 6 percent slopes, used for hay.

The upper part of the subsoil is red clay loam. It extends to a depth of 25 inches. The lower part is yellowish red sandy clay loam and mottled fine sandy loam. It extends to a depth of 40 inches. It is underlain by level-bedded, weathered sandstone.

Important properties of the Nauvoo soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 40 to 60 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Typically, the Sipsey soil has a surface layer of brown loamy sand about 4 inches thick. The subsurface layer is yellowish brown sandy loam. It extends to a depth of 16 inches. The subsoil is strong brown sandy clay loam. It extends to a depth of 31 inches. It is underlain by weathered sandstone.

Important properties of the Sipsey soil—

Permeability: Moderate
Available water capacity: Low
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock

Depth to the water table: More than 6 feet
Flooding: None

Included in this map unit are small areas of Bankhead, Montevallo, and Townley soils. Bankhead and Montevallo soils have many coarse fragments in the subsoil. They are on the steeper side slopes. Montevallo soils are shallower over bedrock than the Nauvoo and Sipsey soils. Townley soils have a clayey subsoil. They are on the lower ridges and the upper side slopes. Also included are soils that are similar to the Sipsey soil but are less than 20 inches over soft sandstone bedrock. The included soils make up about 10 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most areas are used as woodland or pasture. A few areas are used for homesite development.

These soils are poorly suited to most cultivated crops. The main limitations are the slope and the hazard of erosion. Droughtiness, which is caused by the low available water capacity and the depth to bedrock, reduces yields on the Sipsey soil in most years. Measures that control erosion in the less sloping areas include terraces, diversions, grassed waterways, minimum tillage, contour farming, and suitable cropping systems. Returning crop residue to the soil improves tilth and increases the content of organic matter.

These soils are suited to pasture and hay. The gently sloping and sloping, complex slopes limit the use of some haying equipment. Forage plants respond well to the application of fertilizer and lime. If approved management practices are used on these soils, cool-season grasses and legumes grow well.

These soils are well suited to the production of loblolly pine. Other species that grow on this map unit include longleaf pine, Virginia pine, and sweetgum. On the basis of a 50-year site curve, the mean site index for loblolly pine is 85 on the Nauvoo soil and 80 on the Sipsey soil. Loblolly pine can yield 120 cubic feet, or 600 board feet, per acre per year on the Nauvoo soil and 110 cubic feet, or 550 board feet, per acre per year on the Sipsey soil, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, greenbrier, blackberry, flowering dogwood, and bluestem.

The major concerns in managing timber on this map unit are moderate plant competition and a moderate hazard of erosion on the Sipsey soil. Plant competition hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning. Erosion is a hazard in some areas, especially along logging roads and skid trails. Management should include measures that control erosion, such as water bars and a protective cover of vegetation. Site preparation methods that minimize surface disturbance are needed.

The suitability of these soils for urban development is fair. The main limitations are the depth to bedrock, the slope, and the moderate permeability. Most excavations needed in construction can expose the bedrock. The moderate permeability, the depth to bedrock, and the slope are moderate or severe limitations on sites for septic tank absorption fields. The moderate permeability can generally be overcome by increasing the size of the absorption field. The absorption lines should be installed on the contour. Revegetating areas disturbed during construction activities helps to prevent excessive erosion.

This map unit has good potential for both openland and woodland wildlife habitat and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, or promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. Small areas are suitable for the construction of shallow ponds, which provide areas of open water for waterfowl and furbearers.

These soils are well suited or fairly well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily. Care is needed when the topsoil is stockpiled in the steeper areas. Because of the content of sand in the Sipsey soil, erosion is a hazard. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is IVe. The Nauvoo soil is in woodland suitability group 9A, and the Sipsey soil is in woodland suitability group 8A.

PrA—Pruitton loam, 0 to 2 percent slopes, frequently flooded. This deep, well drained, level and nearly level soil is on flood plains along the larger streams in the county. Slopes are smooth and slightly concave. Individual areas are generally long and narrow and are parallel to the streams. They range from 10 to 100 acres in size.

Typically, the surface layer is yellowish brown loam about 7 inches thick. The subsoil is yellowish brown loam. It extends to a depth of 41 inches. It is underlain to a depth of 64 inches by mottled yellowish brown, very pale brown, dark yellowish brown, and strong brown sandy loam.

Important properties of the Pruitton soil—

Permeability: Moderately rapid
Available water capacity: High
Soil reaction: Very strongly acid to medium acid
Organic matter content: Moderate
Natural fertility: Medium
Depth to bedrock: More than 60 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: Frequent, from November through March

Included with this soil in mapping are small areas of Mooreville, Spadra, and Whitwell soils. Mooreville soils are more poorly drained than the Pruitton soil and are in lower positions on the flood plains. Spadra and Whitwell soils have a subsoil that is yellowish and is better developed than that of the Pruitton soil. They are on the higher terraces. Whitwell soils are moderately well drained. Also included are areas of stratified sandy deposits on natural levees and small areas that may be ponded for long periods. The included soils make up 20 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most of the acreage is wooded. Some areas have been cleared and are used for cultivated crops or for pasture and hay.

This soil is fairly well suited to hay and pasture and to cultivated crops. The main hazard is the flooding. The use of equipment is restricted following periods of flooding. Flooding late in the spring may delay tillage and planting in some years. Grasses and legumes respond well to the application of fertilizer and lime on this soil, and forage production is good. Controlled grazing during periods of flooding or wetness helps to prevent compaction and destruction of the sod.

This soil is well suited to the production of loblolly pine. Other species that grow on this map unit include sweetgum, yellow poplar, and various species of oak. On the basis of a 50-year site curve, the mean site index for loblolly pine is 90. Loblolly pine can yield 131 cubic feet, or 655 board feet, per acre per year, as measured when the mean annual increment culminates. The understory is mainly honeysuckle, poison ivy, flowering dogwood, blackberry, and bluestem.

Plant competition is the major concern in managing timber on this map unit. It hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning. Wetness can restrict the use of wheeled logging equipment after periods of flooding or heavy rainfall.

This soil is unsuited to urban development. The main hazard is the frequent flooding. Overcoming this hazard is impractical.

This soil has fair potential for openland and wetland wildlife habitat and good potential for woodland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer and turkeys. The burning should be rotated among several small tracts. Some small areas are suitable for the construction of shallow ponds, which provide areas of open water for waterfowl and furbearers.

This soil is fairly well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily. The frequent flooding interferes with stockpiling during wet periods. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is IIIw, and the woodland suitability group is 9A.

SeE—Sipsey loamy sand, 4 to 18 percent slopes. This moderately deep, well drained, gently sloping to moderately steep soil is on narrow ridgetops and the upper side slopes. Slopes are complex and convex. Individual areas are irregular in shape and range from 15 to 120 acres in size.

Typically, the surface layer is brown loamy sand about 4 inches thick. The subsurface layer is yellowish brown sandy loam about 12 inches thick. The subsoil is strong brown sandy clay loam. It extends to a depth of 31 inches. It is underlain by level-bedded, weathered sandstone.

Important properties of the Sipsey soil—

Permeability: Moderate
Available water capacity: Low
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with this soil in mapping are small areas of Bankhead, Nauvoo, and Townley soils. Bankhead soils have many coarse fragments in the subsoil. They are on the steeper side slopes. Nauvoo soils have a reddish subsoil. They are on ridgetops. Townley soils have a clayey subsoil. They are on the lower ridges and the upper side slopes. Also included are soils that are similar to the Sipsey soil but are less than 20 inches over sandstone bedrock or have a silty subsoil. The

included soils make up about 20 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most areas are used as woodland or pasture. A few small areas are used for cultivated crops or homesite development.

The suitability of the Sipsey soil for cultivated crops is poor. The main management concerns are the slope, the hazard of erosion, and the low available water capacity. Measures that can help to control erosion in the less sloping areas include terraces, diversions, grassed waterways, minimum tillage, contour farming, and suitable cropping systems. Returning crop residue to the soil improves tilth and increases the content of organic matter.

This soil is fairly well suited to pasture and hay. The use of equipment is limited by the slope. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yields.

This soil is well suited to the production of loblolly pine and longleaf pine. Other species that grow on this map unit include various species of oak and hickory. On the basis of a 50-year site curve, the mean site index for loblolly pine is 80. Loblolly pine can yield 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, blackberry, flowering dogwood, huckleberry, and bluestem.

The major concerns in managing timber on this map unit are a moderate hazard of erosion and moderate plant competition. Plant competition hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning. Logging roads, landings, and skid trails can be protected against erosion by constructing diversions and by seeding disturbed areas. Management should include measures that control erosion, such as water bars, drainage dips, and a protective cover of vegetation. Site preparation methods that minimize surface disturbance are needed.

This soil is fairly well suited to urban development. The depth to bedrock and, in the steeper areas, the slope are moderate or severe limitations affecting most uses. Most excavations needed in construction can expose the bedrock. The soil has moderate or severe limitations as a site for septic tank absorption fields. The absorption lines should be installed on the contour, and in most areas the size of the absorption field should be increased. Revegetating construction sites immediately after any surface disturbance helps to control erosion.

This soil has good potential for both openland and woodland wildlife habitat and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to deer, quail, and turkeys. The burning should be rotated among several small tracts. Some small areas are suitable for the construction of shallow ponds, which provide areas of open water for waterfowl and furbearers.

This soil is fairly well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily in the less sloping areas. More care is needed when the topsoil is stockpiled on the steeper slopes. Erosion is a hazard because of the content of sand in the soil. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is IVe, and the woodland suitability group is 8A.

ShE—Sipsey-Bankhead complex, 15 to 45 percent slopes. These moderately deep, well drained, moderately steep to very steep soils are on side slopes. Slopes are short and are concave and convex. Individual areas are irregular in shape and range from 50 to 300 acres in size. They are about 55 percent Sipsey soil and 30 percent Bankhead soil. The two soils occur as areas so intricately mixed and so small that mapping them separately is not practical at the selected scale.

Typically, the Sipsey soil has a surface layer of brown loamy sand about 4 inches thick. The subsurface layer is yellowish brown sandy loam about 12 inches thick. The subsoil is strong brown sandy clay loam. It extends to a depth of 31 inches. It is underlain by level-bedded, weathered sandstone.

Important properties of the Sipsey soil—

Permeability: Moderate
Available water capacity: Low
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Typically, the Bankhead soil has a surface layer of very dark grayish brown sandy loam about 4 inches thick. The upper part of the subsoil is brownish yellow channery sandy loam about 9 inches thick. The lower

part is yellowish brown cobbly sandy loam. It extends to a depth of 26 inches. It is underlain by fractured, hard, level-bedded sandstone.

Important properties of the Bankhead soil—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with this soil in mapping are small areas of Nauvoo, Montevallo, Sunlight, and Townley soils. Nauvoo soils have a subsoil that is redder than that of the Sipsey and Bankhead soils. They are on narrow ridgetops. Montevallo and Sunlight soils are shallower over bedrock than the Sipsey and Bankhead soils and have a higher content of coarse fragments in the subsoil. They are in positions on side slopes similar to those of the Sipsey and Bankhead soils. Townley soils have a clayey subsoil. They are on low ridgetops and the upper side slopes. Also included are soils that are similar to the Bankhead and Sipsey soils but are less than 20 inches deep over sandstone bedrock and soils that are deeper over bedrock than the Bankhead and Sipsey soils and are on colluvial slopes. Also included is sandstone rock outcrop, which is throughout most of the map unit. The included soils make up about 15 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Almost all of the acreage is wooded. A few areas are used as pasture.

These soils are not suited to cultivated crops because of the slope, the hazard of erosion, and droughtiness in most years. The droughtiness is caused by the low available water capacity and the depth to bedrock.

The suitability of these soils for pasture and hay is poor or fair. In the steeper areas the slope severely restricts the use of equipment. Pastures should be established only in the less sloping areas. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yields. Planting only perennial grasses and legumes on these soils reduces the extent of surface disturbance and the hazard of erosion.

These soils are well suited to the production of loblolly pine and longleaf pine. Other species that grow on this map unit include various species of oak and bigleaf magnolia. On the basis of a 50-year site curve, the mean site index for loblolly pine is 80. Loblolly pine can yield 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly flowering dogwood, huckleberry, Alabama azalea, and bluestem.

The major concerns in managing timber on this map unit are the hazard of erosion, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition. Management should include measures that control erosion, such as water bars, drainage dips, and a protective cover of vegetation. Site preparation methods that minimize surface disturbance are needed. In the steeper areas the slope restricts the use of equipment. Tracked equipment can be used on the steeper slopes. Management measures should be applied only when the content of soil moisture is suitable. Droughtiness and the depth to bedrock increase the seedling mortality rate. This rate can be partly offset by increasing the number of seedlings that are planted. Windthrow is a moderate hazard because of the depth to bedrock. Heavy thinning should be avoided. Plant competition hinders tree growth and can prevent adequate reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

The suitability of this map unit for urban development is poor. The main limitations are the depth to bedrock and the slope. Designing and installing sanitary facilities are difficult because of these severe limitations. The absorption lines in septic tank absorption fields should be installed on the contour. Most excavations needed in construction can expose the bedrock.

This map unit has fair or very poor potential for openland wildlife habitat, good or very poor potential for woodland wildlife habitat, and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to wildlife. The burning should be rotated among several small tracts.

These soils are poorly suited to the reclamation of surface-mined areas. Because of the slope and large stones, stockpiling topsoil is difficult. Erosion is a serious hazard because of the content of sand in the Sipsey soil. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is VIIe, and the woodland suitability group is 8R.

SmE—Smithdale sandy loam, 8 to 25 percent slopes. This deep, well drained, strongly sloping and moderately steep soil is on ridgetops and the upper side slopes. Slopes are short and convex. Individual areas are irregular in shape and range from 40 to 250 acres in size.

Typically, the surface layer is very dark grayish brown and dark brown sandy loam about 6 inches thick. The subsurface layer is yellowish brown sandy loam about 12 inches thick. The upper part of the subsoil is red sandy clay loam. It extends to a depth of 28 inches. The lower part to a depth of 62 inches is red sandy loam.

Important properties of the Smithdale soil—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 6 feet
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with this soil in mapping are small areas of Sunlight and Townley soils, small areas of soils that are similar to the Smithdale soil but have more than 35 percent rounded pebbles, and soils that do not decrease in clay content within 60 inches of the surface. Sunlight soils are shallow and have a yellowish subsoil that has many coarse fragments of sandstone and siltstone. They are on the lower, steeper side slopes. Townley soils have a clayey subsoil and are underlain by shale. They are on side slopes and ridgetops. The included soils make up about 15 percent of this map unit. Individual included areas are generally less than 5 acres in size.

The Smithdale soil is used mainly as woodland or pasture. The suitability of this soil for cultivated crops is poor. The strongly sloping and moderately steep, complex slopes and the hazard of erosion are the major limitations.

The suitability of this soil for pasture and hay is poor or fair. The strongly sloping and moderately steep, complex slopes limit the use of equipment. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yields.

This soil is well suited to the production of loblolly pine. Other species that grow on this map unit include various species of oak and hickory, sweetgum, and yellow poplar. On the basis of a 50-year site curve, the mean site index for loblolly pine is 80. Loblolly pine can yield 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, greenbrier, blackberry, flowering dogwood, and bluestem.

The major concerns in managing timber on this map unit are a moderate hazard of erosion and the slope. Management that minimizes the hazard of erosion is essential in harvesting timber, especially along logging roads and skid trails. Logging roads and landings can be protected against erosion by water bars, drainage dips, and a protective cover of vegetation. Site preparation methods that minimize surface disturbance are needed. Conventional methods of harvesting trees can be used in the more gently sloping areas but are more difficult to use in the steeper areas. Tracked equipment is more suitable in the steeper areas, especially those that have a complex slope that restricts the design and use of logging roads and skid trails.

The suitability of this soil for urban uses is poor, mainly because of the slope. The absorption lines in septic tank absorption fields should be installed on the contour. Most sites require excavations. The exposed soil in excavated areas is subject to severe erosion. Mulching and seeding disturbed sites helps to control erosion.

This soil has fair potential for openland wildlife habitat, good potential for woodland wildlife habitat, and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seed available to wildlife. The burning should be rotated among several small tracts.

This soil is fairly well suited to the reclamation of surface-mined areas. The amount of soil material is adequate. Because of the strongly sloping and moderately steep slopes, however, stockpiling topsoil is difficult in places. The soil erodes easily. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is VIIe, and the woodland suitability group is 8A.

SpB—Spadra-Whitwell complex, 0 to 3 percent slopes, occasionally flooded. These deep, well drained and moderately well drained, nearly level and gently sloping soils are on low stream terraces. They generally are occasionally flooded, but some areas below Lewis Smith Dam along the Black Warrior River and areas at the higher elevations along the Blackwater, Lost, and Wolf Creeks are only rarely

flooded. Slopes are generally long, smooth, and slightly convex. Individual areas are generally long and fairly broad and parallel the streams. They range from 20 to 120 acres in size. They are about 45 percent Spadra soil and 40 percent Whitwell soil. The two soils occur as areas so intricately mixed or so small that mapping them separately is not practical at the selected scale.

Typically, the Spadra soil has a surface layer of dark yellowish brown fine sandy loam about 7 inches thick. The subsoil is loam throughout. The upper part is dark brown. It extends to a depth of 21 inches. The next part is mottled dark yellowish brown, yellowish brown, and light yellowish brown. It extends to a depth of 33 inches. The lower part is dark brown and mottled. It extends to a depth of 58 inches. The underlying material to a depth of 64 inches or more is dark yellowish brown sandy loam.

Important properties of the Spadra soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid to medium acid
Organic matter content: Moderate
Natural fertility: Medium
Depth to bedrock: More than 6 feet
Root zone: Same as depth to bedrock
Depth to the water table: Below 6 feet
Flooding: Occasional, from December through April

Typically, the Whitwell soil has a surface layer of brown silt loam about 8 inches thick. The upper part of the subsoil is brown silt loam mottled with pale brown and strong brown. It extends to a depth of 16 inches. The lower part is mottled light yellowish brown, brownish yellow, and yellowish brown loam. It extends to a depth of 52 inches. It is underlain to a depth of 64 inches by mottled yellowish brown, light gray, dark brown, and light yellowish brown, stratified loam and sandy loam.

Important properties of the Whitwell soil—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Moderate
Natural fertility: Medium
Depth to bedrock: More than 6 feet
Root zone: Same as depth to bedrock
Depth to the water table: 2 to 3 feet, from December through March
Flooding: Occasional, from December through March

Included with these soils in mapping are small areas of Allen, Mooreville, Pruitton, and Townley soils. Allen soils have a red subsoil. They are on the higher ridges and foot slopes in the uplands. Mooreville and Pruitton soils are on flood plains. They do not have a well developed subsoil. Townley soils have a clayey subsoil. They are on ridges and side slopes. Also included are small areas of soils that are similar to the Spadra soil but have a silty subsoil, soils that are shallower over bedrock than the Spadra and Whitwell soils, and small areas that may remain ponded for a few days to a month or more. The included soils make up about 15 percent of this map unit. Individual included areas are generally less than 5 acres in size.

This map unit is used mainly as pasture or woodland. Some areas are used for cultivated crops.

The suitability of the Spadra and Whitwell soils for locally grown cultivated crops is good. The main management concerns are the flooding and wetness late in winter and early in spring. In some years spring tillage is delayed until the content of soil moisture is reduced. Adding plant residue and other forms of organic matter can improve tilth and increase the infiltration rate in these soils.

These soils are suited to hay and pasture (fig. 8). The main limitations are the flooding and wetness during the winter and early in spring. The use of equipment is restricted during wet periods. The wetness can delay some pasture management activities in some years. Deferred grazing during wet periods helps to prevent compaction and destruction of the sod. Grasses and legumes respond well to the application of plant nutrients.

These soils are well suited to the production of loblolly pine. Other species that grow on this map unit include sweetgum and yellow poplar. On the basis of a 50-year site curve, the mean site index for loblolly pine is 95 on the Spadra soil and 90 on the Whitwell soil. Loblolly pine can yield 142 cubic feet, or 710 board feet, per acre per year on the Spadra soil and 131 cubic feet, or 600 board feet, per acre per year on the Whitwell soil, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, greenbrier, dewberry, flowering dogwood, and bluestem.

The major concerns in managing timber on this map unit are severe plant competition on both soils and a moderate equipment limitation and moderate seedling mortality on the Whitwell soil. In some years the seasonal high water table and flooding restrict the use of harvesting, planting, and other timber management equipment to periods of suitable soil moisture content. In some years the seasonal wetness of the Whitwell soil and flooding on both soils increase the seedling mortality rate. A surface drainage system in the more nearly level areas increases the seedling survival rate. Plant competition hinders tree growth and can prevent

Figure 8.—Improved pasture in an area of Spadra-Whitwell complex, 0 to 3 percent slopes, occasionally flooded.

adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

These soils are unsuited to urban development. The major management concerns are the flooding and the wetness. Overcoming these limitations is impractical.

This map unit has good potential for openland and woodland wildlife habitat and poor or very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to wildlife. The burning should be rotated among several small tracts. Small areas may be suitable for the construction of shallow ponds, which provide areas of open water for waterfowl and furbearers.

These soils are well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily. This map unit is considered prime farmland; thus, the various soil layers should be removed and stored separately so that they can be replaced in their original sequence. Measures that prevent crusting and compaction are needed. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is IIw. The Spadra soil is in woodland suitability group 10A, and the Whitwell soil is in woodland suitability group 9W.

SsE—Sunlight-Sipsey complex, 15 to 40 percent slopes. These shallow and moderately deep, well

drained, moderately steep to very steep soils are on highly dissected side slopes. Slopes are generally short and are complex and convex. Individual areas are irregular in shape and conform to the configuration of the rough landscape. They range from 80 to 400 acres in size. They are about 45 percent Sunlight soil and 40 percent Sipsey soil. The two soils occur as areas so intricately mixed and so small that mapping them separately is not practical at the selected scale.

Typically, the Sunlight soil has a surface layer of brown channery sandy loam about 3 inches thick. The subsoil is yellowish brown and strong brown channery and very channery silty clay loam. It extends to a depth of 12 inches. It is underlain by yellowish brown, weathered, fractured sandstone.

Important properties of the Sunlight soil—

Permeability: Moderate
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 10 to 20 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Typically, the Sipsey soil has a surface layer of brown loamy sand about 4 inches thick. The subsurface layer is yellowish brown loamy sand about 8 inches thick. The subsoil is strong brown clay loam. It extends to a depth of 31 inches. It is underlain by soft sandstone.

Important properties of the Sipsey soil—

Permeability: Moderate
Available water capacity: Low
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with these soils in mapping are small areas of Bankhead, Mooreville, Montevallo, Nauvoo, and Townley soils. Bankhead and Montevallo soils have many coarse fragments in the subsoil. They are on steep side slopes. Mooreville soils are somewhat poorly drained and are in drainageways. Nauvoo soils have a subsoil that is red and is thicker than that of the Sunlight and Sipsey soils. They are on ridgetops. Townley soils have a clayey subsoil. They are on the lower ridgetops and the upper side slopes. Also included are small areas of rock outcrop. The included soils make up about 15 percent of this map unit. Individual included areas are generally less than 5 acres in size.

The Sunlight and Sipsey soils are used mainly as woodland. A few small areas have been cleared and are used as pasture.

These soils are poorly suited to cultivated crops, pasture, and hay. The use of equipment is limited by the moderately steep to very steep, complex slopes. The soils are droughty because of the depth to bedrock and the very low or low available water capacity.

These soils are well suited to the production of loblolly pine. Other species that grow on this map unit include Virginia pine and sweetgum. On the basis of a 50-year site curve, the mean site index for loblolly pine is 70 on the Sunlight soil and 80 on the Sipsey soil. Loblolly pine can yield 93 cubic feet, or 465 board feet, per acre per year on the Sunlight soil and 110 cubic feet, or 550 board feet, per acre per year on the Sipsey soil, as measured when the mean annual increment culminates. The understory vegetation is mainly flowering dogwood, honeysuckle, blackberry, and bluestem.

The main concerns in managing timber on this map unit are the hazard of erosion, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition. Management should include measures that control erosion on all disturbed sites, such as logging roads, landings, and skid trails. These measures include water bars, drainage dips, and a protective cover of vegetation. Site preparation methods that minimize surface disturbance are needed. In the steeper areas the slope restricts the use of equipment. Tracked equipment can be used on the steeper slopes. Management measures should be applied only when the content of soil moisture is suitable. Droughtiness and the depth to bedrock increase the seedling mortality rate. This rate can be partly offset by increasing the number of seedlings that are planted. Windthrow is a severe or moderate hazard because of the depth to bedrock. Heavy thinning should be avoided. Plant competition hinders tree growth and can prevent adequate reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

These soils are poorly suited to urban development because of the slope and the depth to bedrock. The slope limits the installation of septic tank absorption fields. The absorption lines should be installed on the contour where feasible. Erosion is a hazard. Only the part of the site that is used for construction should be disturbed. Any excavations during construction expose the siltstone and sandstone bedrock.

This map unit has poor or fair potential for openland

wildlife habitat, fair or good potential for woodland wildlife habitat, and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to wildlife. The burning should be rotated among several small tracts. Some small areas are suitable for the construction of shallow ponds, which provide areas of open water for waterfowl and furbearers.

These soils are poorly suited to the reclamation of surface-mined areas. Because of an inadequate amount of soil material and the slope, topsoil reclamation is difficult. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is VIIe. The Sunlight soil is in woodland suitability group 6D, and the Sipsey soil is in woodland suitability group 8R.

StE—Sunlight-Townley complex, 15 to 45 percent slopes. These shallow and moderately deep, well drained, moderately steep to very steep soils are on highly dissected ridgetops, side slopes, and the lower slopes. Slopes are short and are complex and convex. Individual areas are irregular in shape and conform to the configuration of the rough landscape. They range from 60 to 500 acres in size. They are about 45 percent Sunlight soil and 40 percent Townley soil. The two soils occur as areas so intricately mixed and so small that mapping them separately is not practical at the selected scale.

Typically, the Sunlight soil has a surface layer of dark brown channery silt loam about 3 inches thick. The upper part of the subsoil is yellowish brown channery silty clay loam. It extends to a depth of 5 inches. The lower part is strong brown very channery silty clay loam. It extends to a depth of 12 inches. It is underlain by yellowish brown, weathered, fractured shaly siltstone and sandstone.

Important properties of the Sunlight soil—

Permeability: Moderate
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 10 to 20 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Typically, the Townley soil has a surface layer of very dark grayish brown silt loam about 3 inches thick. The subsurface layer is brown gravelly loam. It extends to a depth of 7 inches. The upper part of the subsoil is strong brown clay. It extends to a depth of 27 inches. The lower part is strong brown and brownish yellow clay. It extends to a depth of 36 inches. It is underlain by brown, red, and gray, weathered siltstone and shale.

Important properties of the Townley soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with these soils in mapping are small areas of Montevallo, Nauvoo, and Sipsey soils. Montevallo soils do not have a well developed subsoil. They are in positions on side slopes similar to those of the Sunlight and Townley soils. Nauvoo soils have a thick, red subsoil. They are on the upper ridgetops. Sipsey soils do not have a significant number of coarse fragments in the subsoil. They are on side slopes. The included soils make up about 15 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most areas are wooded. A few areas are used as pasture.

These soils are poorly suited to cultivated crops. In the steeper areas the slope severely limits the use of equipment. Erosion may be severe if the soils are tilled and are not protected. The Sunlight soil is droughty, and crops are adversely affected because of the lack of adequate moisture during the growing season.

These soils are fairly well suited to pasture (fig. 9). The slope limits the use of equipment, thus limiting most needed management practices, including weed control, haying, and the application of plant nutrients needed for productive forage.

This map unit is well suited to the production of loblolly pine. Other species that grow on this map unit include Virginia pine and various species of oak and hickory. On the basis of a 50-year site curve, the mean site index for loblolly pine is 70 on the Sunlight soil and 80 on the Townley soil. Loblolly pine can yield 93 cubic feet, or 465 board feet, per acre per year on the

Figure 9.—A pastured area of Sunlight-Townley complex, 15 to 45 percent slopes, on a rolling ridgetop.

Sunlight soil and 110 cubic feet, or 550 board feet, per acre per year on the Townley soil, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, blackberry, flowering dogwood, and bluestem.

The main concerns in managing timber on this map unit are a severe equipment limitation and a severe erosion hazard caused by the slope. On the Sunlight soil, the hazard of windthrow is severe and seedling mortality is moderate. Plant competition is moderate on the Townley soil. Conventional methods of harvesting trees can be used in the less sloping areas but are difficult to use in the steeper areas. Tracked equipment can be used in the steeper areas. Logging roads, skid trails, and landings can be protected against erosion by constructing diversions and by seeding disturbed areas. Because the clayey Townley soil is sticky when wet and has a limited load-supporting capacity, most planting and harvesting equipment should be used only during dry periods. Trees are subject to windthrow because of the limited rooting depth of these soils. Heavy thinning should be avoided. Droughtiness and the shallowness to bedrock increase the seedling mortality rate, especially on the Sunlight soil. This rate can be partly offset by increasing the number of seedlings that are planted. Plant competition hinders tree growth and prevents adequate reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

These soils are poorly suited to urban development. The slope limits the installation of septic tank absorption fields. The absorption lines should be installed on the contour. Many absorption fields do not function properly because of the slow permeability in the Townley soil. Increasing the size of the absorption field helps to overcome this limitation. Erosion is a hazard. Only the part of the site that is used for construction should be disturbed. Any excavations during construction can expose the shale, siltstone, and sandstone bedrock. Properly designing buildings and roads helps to offset the effects of the limited load-supporting capacity in the Townley soil.

These soils have poor or fair potential for openland wildlife habitat, fair or good potential for woodland wildlife habitat, and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to wildlife. The burning should be rotated among several small tracts.

These soils are poorly suited or fairly well suited to the reclamation of surface-mined areas. The Sunlight soil does not have an adequate amount of soil material for stockpiling. The Townley soil has more soil material, but it is clayey. Because of the rolling to very steep landscape, reclamation is difficult.

The capability subclass is VIIe. The Sunlight soil is in woodland suitability group 6D, and the Townley soil is in woodland suitability group 8R.

SuE—Sunlight-Townley-Urban land complex, 15 to 45 percent slopes. This map unit consists of moderately steep to very steep areas of a shallow, well drained Sunlight soil on side slopes; a moderately deep, well drained Townley soil, generally on ridgetops and the upper side slopes; and Urban land. Slopes are short and are complex and convex. Individual areas are irregular in shape and conform to the natural landscape. They range from 20 to 100 acres in size. They are about 35 percent Sunlight soil, 30 percent Townley soil, and 15 percent Urban land. The two soils and Urban land occur as areas so small and so intricately mixed that mapping them separately is not practical at the selected scale.

Typically, the Sunlight soil has a surface layer of dark brown channery loam about 3 inches thick. The upper part of the subsoil is yellowish brown channery silty clay loam. It extends to a depth of 5 inches. The lower part is strong brown very channery silty clay loam. It extends to a depth of 14 inches. It is underlain by yellowish brown, weathered, fractured shaly siltstone and sandstone.

Important properties of the Sunlight soil—

Permeability: Moderate
Available water capacity: Very low
Soil reaction: Very strongly acid or strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 10 to 20 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Typically, the Townley soil has a surface layer of dark grayish brown silt loam about 5 inches thick. The subsoil is strong brown and yellowish red clay. It extends to a depth of 36 inches. It is underlain by red and gray, weathered shale.

Important properties of the Townley soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Urban land occurs as areas covered by buildings, sidewalks, driveways, streets, parking lots, and other structures that so obscure or alter the soils that identification of the soil series is not feasible.

Included in mapping are small areas of Nauvoo, Sipsey, and Montevallo soils. Nauvoo soils have a thick, red subsoil. They are on the less sloping ridgetops. Sipsey soils are moderately deep and have a loamy subsoil. They are on side slopes. Montevallo soils are shallow and have many coarse fragments in the subsoil. They are on steep side slopes. The included soils make up about 20 percent of this map unit. Individual included areas are less than 5 acres in size.

This map unit is poorly suited to homesite and urban development. The slope, the depth to bedrock, and the slow permeability in the Townley soil limit the installation of septic tank absorption fields. The absorption lines should be installed on the contour. Many absorption fields do not function properly because of the slow permeability and the depth to bedrock. In some areas these limitations can be overcome by increasing the size of the absorption field. Erosion is a hazard, especially in the steeper areas. Properly designing access roads helps to control surface runoff

and stabilize cut slopes. Only the part of the site that is used for construction should be disturbed. Properly designing buildings and roads helps to offset the limited load-supporting capacity of the Townley soil and helps to prevent the damage caused by shrinking and swelling. Any excavations during construction can expose the shale, siltstone, and sandstone bedrock. The risk of corrosion is low on uncoated steel and high on concrete.

Plans for homesite development should provide for the preservation of as many trees as possible. When the site is landscaped, removal of surface coarse fragments or applications of topsoil to disturbed areas are required for the best results, particularly in areas used for lawns. A plant cover can be established and maintained through proper applications of fertilizer, seeding, mulching, and shaping of the slopes.

This map unit is not assigned a capability subclass or a woodland suitability group.

ToB—Townley silt loam, 2 to 6 percent slopes. This moderately deep, well drained, gently sloping soil is on broad upland flats, ridgetops, benches, and toe slopes. Slopes are complex and convex. Individual areas are irregular in shape and range from 10 to 150 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 3 inches thick. The subsurface layer is brown loam about 2 inches thick. The subsoil is strong brown and red clay. It is mottled in the lower part. It extends to a depth of 36 inches. It is underlain by mottled, level-bedded, weathered shale.

Important properties of the Townley soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with this soil in mapping are a few small areas of Montevallo, Nauvoo, Nectar, Sipsey, Sunlight, and Wynnville soils. Montevallo, Sipsey, and Sunlight soils have a yellowish subsoil and are shallow or moderately deep. They are on the steeper side slopes. Montevallo and Sunlight soils have many coarse fragments in the subsoil. Nauvoo and Nectar soils are deep and have a red subsoil. They are in positions on ridgetops similar to or slightly higher than those of the Townley soil. Wynnville soils are moderately well drained and are on the lower terraces. Also included are small areas of soils that are similar to the Townley soil but have a solum that is more than 40 or less than 20 inches thick or have a yellower subsoil and some small areas of more poorly drained soils in the drainageways or depressions. The included soils make up about 20 percent of this map unit. Individual included areas are generally less than 5 acres in size.

The Townley soil is used mainly as pasture (fig. 10). Some small areas are used as woodland or cropland or for urban development.

The suitability of this soil for cultivated crops is fair. The main management concern is the hazard of erosion. Measures that can control erosion include minimum tillage, contour farming, suitable cropping systems, and terraces, diversions, and grassed waterways. Crops respond well to the application of plant nutrients. Because of the depth of the root zone, droughtiness, or the lack of adequate soil moisture, can be a problem affecting some crops during the growing season.

This soil is well suited to hay and pasture. The use of equipment is limited in the more complex sloping areas. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yields. Grazing when the soil is wet can cause compaction and destruction of the sod.

This soil is well suited to the production of loblolly pine. Other species that grow on this map unit include various species of oak and hickory, sweetgum, and yellow poplar. On the basis of a 50-year site curve, the mean site index for loblolly pine is 80. Loblolly pine can yield 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, dewberry, huckleberry, flowering dogwood, brackenfern, and bluestem.

The major concerns in managing timber on this map unit are a moderate equipment limitation, a moderate windthrow hazard, and moderate plant competition. The equipment limitation is caused by the slope. Using conventional harvesting equipment when the soil is wet causes rutting and compaction. Trees are subject to windthrow because of the restricted rooting depth. Heavy thinning should be avoided. Plant competition hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

This soil is poorly suited to urban development. The major limitations are the depth to bedrock, the slow permeability, the shrink-swell potential, and low strength. Many septic tank absorption fields do not function properly because of the slow permeability. Increasing the size of the absorption field can help to

Figure 10.—Tall fescue pasture in an area of Townley silt loam, 2 to 6 percent slopes.

overcome this limitation. Properly designing buildings and roads helps to offset the limited load-supporting capacity and helps to prevent the damage caused by shrinking and swelling. The hazard of erosion increases if the soil is exposed during site development. Most excavations expose the underlying shaly bedrock, which can be dug or ripped by heavy machinery.

This soil has good potential for openland and woodland wildlife habitat and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to wildlife. The burning should be rotated among several small tracts. Some small areas are suitable for the construction of shallow ponds, which provide areas of open water for waterfowl and furbearers.

This soil is fairly well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily. Because the soil is clayey, compaction and crusting occur when the soil material is reapplied to the surface-mined areas. These areas should be mulched and seeded as soon as possible after the soil material is reapplied to the surface.

The capability subclass is IIIe, and the woodland suitability group is 8C.

ToD—Townley silt loam, 6 to 15 percent slopes. This moderately deep, well drained, gently sloping to strongly sloping soil is on ridgetops, side slopes, and toe slopes. Slopes are complex and convex. Individual areas are irregular in shape and range from 20 to 200 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 3 inches thick. The subsurface layer is brown loam about 2 inches thick. The subsoil is strong brown and red clay. It is mottled in the lower part. It extends to a depth of 36 inches. It is underlain by mottled, level-bedded, weathered shale.

Important properties of the Townley soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches

Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Included with this soil in mapping are a few small areas of Montevallo, Nauvoo, Sipsey, and Sunlight soils. Montevallo, Sipsey, and Sunlight soils have a loamy subsoil. They are on the steeper side slopes. Nauvoo soils have a red, loamy subsoil. They are in the higher positions on ridgetops. Also included are small areas of soils that are similar to the Townley soil but have a solum that is more than 40 or less than 20 inches thick or have a yellower subsoil and soils that have less than 35 percent clay and have bedrock within a depth of 40 inches. The included areas make up about 20 percent of this map unit. Individual included areas are generally less than 5 acres in size.

The Townley soil is used mainly as woodland. Some small areas are used as pasture or cropland or for urban development.

The suitability of this soil for cultivated crops is fair or poor. The main management concern is the hazard of erosion. Because of the hazard of erosion and the complex slopes, the steeper areas are not suited to the crops commonly grown in the county. Measures that can control erosion in the less sloping areas include minimum tillage, contour farming, suitable cropping systems, and terraces, diversions, and grassed waterways.

This soil is well suited to hay and pasture. The use of equipment is limited in the more complex sloping areas. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yields. The soil is better suited to perennial grasses and legumes than to other forage plants. Tillage and seedbed preparation can increase the hazard of erosion.

This soil is well suited to the production of loblolly pine. Other species that grow on this map unit include various species of oak and hickory, sweetgum, and Virginia pine. On the basis of a 50-year site curve, the mean site index for loblolly pine is 80. Loblolly pine can yield 110 cubic feet, or 550 board feet, per acre per year, as measured when the mean annual increment culminates. The understory vegetation is mainly honeysuckle, dewberry, huckleberry, flowering dogwood, brackenfern, and bluestem.

The major concerns in managing timber on this map unit are a moderate equipment limitation, moderate windthrow and erosion hazards, and moderate plant competition. The equipment limitation is caused by the slope. Using conventional harvesting equipment when the soil is wet causes rutting and compaction. Conventional methods of harvesting trees can be used in the more gently sloping areas but are difficult to use in the steeper areas. Logging roads and landings can be protected against erosion by constructing diversions and by seeding disturbed areas. Trees are subject to windthrow because of the restricted rooting depth. Heavy thinning should be avoided. Plant competition hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

This soil is poorly suited to most kinds of urban development. The major limitations are the slope, the depth to bedrock, the slow permeability, the shrink-swell potential, and low strength. Many septic tank absorption fields do not function properly because of the slow permeability in the subsoil. Increasing the size of the absorption field can help to overcome this limitation. Properly designing buildings and roads helps to offset the limited load-supporting capacity and helps to prevent the damage caused by shrinking and swelling. The hazard of erosion increases if the soil is exposed during site development. Most excavations expose the underlying shaly bedrock, which generally can be dug or ripped by heavy machinery.

This soil has good potential for openland and woodland wildlife habitat and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to wildlife. The burning should be rotated among several small tracts.

This soil is fairly well suited or poorly suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily in the less sloping areas. More care is needed in the steeper areas. The soil is clayey, and compaction and crusting occur when the soil material is reapplied to the surface-mined areas. These areas should be mulched and seeded as soon as possible after the soil material is reapplied to the surface.

The capability subclass is VIe, and the woodland suitability group is 8R.

TuC—Townley-Urban land complex, 2 to 15 percent slopes. This map unit consists of a moderately deep, well drained, gently sloping to strongly sloping Townley soil and areas of Urban land on dissected ridgetops and side slopes. Slopes are complex and convex. Individual areas are irregular in shape and conform to the natural landscape. They range from 10 to 80 acres in size. They are about 60 percent Townley soil and 30 percent Urban land. The Townley soil and Urban land occur as areas so small and so intricately

mixed that mapping them separately is not practical at the selected scale.

Typically, the Townley soil has a surface layer of very dark grayish brown silt loam about 5 inches thick. The subsoil is yellowish red and red clay. It has yellow and brown mottles in the lower part. It extends to a depth of 36 inches. It is underlain by mottled, level-bedded, weathered shale.

Important properties of the Townley soil—

Permeability: Slow
Available water capacity: Moderate
Soil reaction: Extremely acid to strongly acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: 20 to 40 inches
Root zone: Same as depth to bedrock
Depth to the water table: More than 6 feet
Flooding: None

Urban land occurs as areas covered by buildings, sidewalks, driveways, streets, parking lots, and other structures that so obscure or alter the soils that identification of the soil series is not feasible.

Included in mapping are small areas of Montevallo, Nauvoo, Sipsey, Sunlight, and Whitwell soils. Montevallo, Sipsey, and Sunlight soils have a loamy subsoil. They are on the steeper side slopes. Nauvoo soils are deep and have a loamy subsoil. They are on the higher ridgetops. Whitwell soils have a loamy subsoil. They are moderately well drained and are in the lowest positions on toe slopes and terraces. The included soils make up about 10 percent of this map unit. Individual included areas are generally less than 5 acres in size.

The Townley soil is poorly suited to homesite and urban development. The slow permeability, the depth to bedrock, the shrink-swell potential, and low strength are the major limitations. Many septic tank absorption fields do not function properly because of the slow permeability and the depth to bedrock. Increasing the size of the absorption field can help to overcome these limitations. The absorption lines should be installed on the contour. Any excavations during construction expose the shale and siltstone bedrock, which can be interbedded with sandstone bedrock. The risk of corrosion is low on uncoated steel and high on concrete. Erosion is a hazard, especially in the more sloping areas. Properly designing access roads helps to control surface runoff and stabilize cut slopes. Only the part of the site that is used for construction should be disturbed. Properly designing buildings and roads helps to offset the limited load-supporting capacity of the soil and helps to prevent the damage caused by shrinking and swelling.

Plans for homesite development should provide for the preservation of as many trees as possible. When the site is landscaped, removal of surface coarse fragments or applications of topsoil to disturbed areas are required for the best results, particularly in areas used for lawns. A plant cover can be established and maintained through proper applications of fertilizer, seeding, mulching, and shaping of the slopes.

This map unit is not assigned a capability subclass or a woodland suitability group.

WyB—Wynnville fine sandy loam, 0 to 4 percent slopes. This deep, moderately well drained, level to gently sloping soil is on old, high stream terraces. Slopes are smooth and slightly convex. Individual areas are irregular in shape and range from 10 to 75 acres in size.

Typically, the surface layer is brown fine sandy loam about 10 inches thick. The upper part of the subsoil is strong brown loam. It extends to a depth of 22 inches. The next part is a slightly brittle, compact fragipan of yellowish brown loam and strong brown sandy clay loam with tongues and pockets of light gray sandy loam. It extends to a depth of 56 inches. The lower part to a depth of 64 inches is strong brown sandy clay loam that has yellowish red and light brownish gray mottles.

Important properties of the Wynnville soil—

Permeability: Moderate in the upper part of the subsoil and moderately slow in and below the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: Same as depth to the fragipan
Depth to the water table: 1.5 to 2.5 feet, from December through February
Flooding: None

Included with this soil in mapping are small areas of Nauvoo, Nectar, Sipsey, and Townley soils. Nauvoo and Nectar soils have a red subsoil and are underlain by sandstone bedrock. They are well drained and are on the higher ridges on terraces and uplands. Sipsey soils are well drained and are on the steeper side slopes. They are underlain by sandstone bedrock. Townley soils have a clayey subsoil. They are on the higher ridgetops and side slopes. Also included are soils that are similar to the Wynnville soil but do not have a fragipan or have a more silty subsoil. The

included soils make up about 20 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most areas are used for pasture, cultivated crops, or woodland. A few areas are used for urban development.

The suitability of the Wynnville soil for cultivated crops is good. The main management concerns are the slope and the hazard of erosion. Measures that can control erosion include terraces, diversions, grassed waterways, minimum tillage, contour farming, and suitable cropping systems. The use of equipment is severely limited during wet periods. Returning crop residue to the soil can improve tilth and fertility. In the less sloping areas, spring tillage may be delayed in some years because of excessive soil moisture.

This soil is well suited to pasture and hay. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yields. Forage plants respond well to the application of fertilizer and lime. Restricted grazing during periods of excessive soil moisture helps to prevent compaction.

This soil is well suited to the production of loblolly pine. Other species that grow on this map unit include sweetgum, yellow poplar, and various species of oak. On the basis of a 50-year site curve, the mean site index for loblolly pine is 85. Loblolly pine can yield 120 cubic feet, or 600 board feet, per acre per year, as measured when the mean annual increment culminates. The understory is mainly honeysuckle, blackberry, huckleberry, poison ivy, flowering dogwood, and bluestem.

Plant competition is the major concern in managing timber on this map unit. Using conventional harvesting equipment when the soil is wet can cause rutting and compaction. Plant competition hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

This soil is poorly suited to urban uses. The major limitations are the moderately slow permeability and the wetness. Septic tank absorption fields do not function properly because of the moderately slow permeability and the wetness. A drainage system can lower the seasonal high water table in some areas. Overcoming the wetness is impractical on sites for most urban uses.

This soil has good potential for openland and woodland wildlife habitat and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to wildlife. The burning should be rotated among several small tracts. Some small areas are suitable for the construction of shallow ponds, which provide areas of open water for waterfowl and furbearers.

This soil is well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily. This map unit is considered prime farmland; thus, the various soil layers should be removed and stored separately so that they can be replaced in their original sequence. Measures that prevent crusting and compaction are needed. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is IIe, and the woodland suitability group is 8A.

WyC—Wynnville fine sandy loam, 4 to 8 percent slopes. This deep, moderately well drained, gently sloping and sloping soil is on old, high stream terraces. Slopes are generally smooth and convex. Individual areas are irregular in shape and range from 10 to 60 acres in size.

Typically, the surface layer is brown fine sandy loam about 10 inches thick. The upper part of the subsoil is strong brown loam. It extends to a depth of 22 inches. The next part is a slightly brittle, compact fragipan of yellowish brown loam and strong brown sandy clay loam with tongues and pockets of light gray sandy loam. It extends to a depth of 56 inches. The lower part to a depth of 64 inches is strong brown sandy clay loam that has yellowish red and light brownish gray mottles.

Important properties of the Wynnville soil—

Permeability: Moderate in the upper part of the subsoil and moderately slow in and below the fragipan
Available water capacity: Moderate
Soil reaction: Very strongly acid to medium acid
Organic matter content: Low
Natural fertility: Low
Depth to bedrock: More than 60 inches
Root zone: Same as depth to the fragipan
Depth to the water table: 1.5 to 2.5 feet, from December through February
Flooding: None

Included with this soil in mapping are small areas of Nauvoo, Nectar, Sipsey, and Townley soils. Nauvoo and Nectar soils have a red subsoil and are underlain by sandstone bedrock. They are well drained and are on the higher ridges on terraces and uplands. Sipsey soils are well drained and are on the steeper side slopes. They are underlain by sandstone bedrock. Townley soils have a clayey subsoil. They are on the higher ridgetops and side slopes. Also included are

soils that are similar to the Wynnville soil but do not have a fragipan or have a redder or a more silty subsoil. The included soils make up about 20 percent of this map unit. Individual included areas are generally less than 5 acres in size.

Most areas are used for pasture, cultivated crops, or woodland. A few areas are used for homesite development.

The suitability of the Wynnville soil for cultivated crops is fair. The main management concerns are the slope and the hazard of erosion. Measures that can control erosion include terraces, diversions, grassed waterways, minimum tillage, contour farming, and suitable cropping systems. Returning crop residue to the soil can improve tilth and fertility.

This soil is well suited to pasture and hay. Proper grazing practices, weed control, and fertilizer are needed for maximum forage quality and yields. Forage plants respond well to the application of fertilizer and lime. Restricted grazing during periods of excessive soil moisture helps to prevent compaction.

This soil is well suited to the production of loblolly pine. Other species that grow on this map unit include sweetgum, yellow poplar, and various species of oak. On the basis of a 50-year site curve, the mean site index for loblolly pine is 85. Loblolly pine can yield 120 cubic feet, or 600 board feet, per acre per year, as measured when the mean annual increment culminates. The understory is mainly honeysuckle, hackberry, huckleberry, poison ivy, flowering dogwood, and bluestem.

Plant competition is the major concern in managing timber on this map unit. Using conventional harvesting equipment when the soil is wet causes rutting and compaction. Plant competition hinders tree growth and can prevent adequate natural or artificial reforestation. It can be controlled by mechanical methods, herbicides, or prescribed burning.

This soil is poorly suited to urban uses. The major limitations are the moderately slow permeability, the wetness, and the slope. Septic tank absorption fields may not function properly because of the moderately slow permeability and the wetness. The absorption lines should be installed on the contour. Mulching and revegetating areas disturbed during construction help to control erosion. A drainage system can lower the seasonal high water table in some areas.

This soil has good potential for openland and woodland wildlife habitat and very poor potential for wetland wildlife habitat. The openland and woodland wildlife habitat can be improved by planting suitable seed and forage crops, maintaining the existing plant cover, and promoting the natural regeneration and establishment of desirable plants. Prescribed burning every 3 years can increase the amount of palatable browse and seeds available to wildlife. The burning should be rotated among several small tracts. Some small areas are suitable for the construction of shallow ponds, which provide areas of open water for waterfowl and furbearers.

This soil is well suited to the reclamation of surface-mined areas. Topsoil can be stockpiled fairly easily. Measures that prevent crusting and compaction are needed. Surface-mined areas should be mulched and seeded as soon as possible after soil material is reapplied to the surface.

The capability subclass is IIIe, and the woodland suitability group is 8A.

Prime Farmland

In this section, prime farmland is defined and the soils in Walker County that are considered prime farmland are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. The moisture supply must be adequate, and the growing season must be sufficiently long. Prime farmland produces the highest yields with minimal expenditure of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either are used for food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming

in national forests, national parks, military reservations, and state parks.

Prime farmland soils usually receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent.

The following map units are considered prime farmland in Walker County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 5. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

The soils identified as prime farmland in Walker County are:

NnB	Nauvoo and Nectar fine sandy loams, 2 to 6 percent slopes
SpB	Spadra-Whitwell complex, 0 to 3 percent slopes, occasionally flooded
WyB	Wynnville fine sandy loam, 0 to 4 percent slopes

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Kenneth M. Rogers, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

In 1982, Walker County had about 21,000 acres of cropland and 57,700 acres of pasture *(16)*. About 9,000 acres was used for soybeans and 1,900 acres for corn. About 7,700 acres of grasses and legumes was harvested for hay *(2)*. Vegetable crops were grown on a small acreage, mainly in areas of soils on a sandstone plateau in the southeastern part of the county.

The acreage of cultivated crops has been decreasing, and the acreage of pasture has been increasing. Development of surface coal mining has increased rapidly. Much of the acreage formerly used for agricultural purposes is now idle land because of expected future mining activity. Current and potential agricultural land that can be surface mined could be adversely affected unless properly reclaimed.

The potential of the soils in Walker County for increased production of food and fiber is fair. About 47,000 acres of potential cropland is used as pasture or woodland. Because of large landholdings by commercial companies, much of the cropland potential is limited. Yields could be increased in cultivated areas if the most recent technology were applied. This soil survey helps in making land management decisions and in applying recent crop production technology.

Field crops suited to the soils and climate of Walker County include many that are not commonly grown. Soybeans, corn, and wheat are the main crops. Grain sorghum can be grown. Wheat is generally the only close-growing crop planted for grain. Oats, rye, and barley could be grown.

Water erosion is a major problem on about two-thirds of the cropland and one-fourth of the pasture in Walker

County. If the slope is more than 2 percent, erosion is a hazard. Allen, Nauvoo, Townley, Sipsey, and Wynnville are some of the cultivated soils that have slopes of 2 percent or more.

Soil loss through erosion is damaging in several ways. Loss of the surface layer and incorporation of part of the subsoil into the plow layer reduce productivity. Loss of the surface layer especially damages soils that have a clayey subsoil, such as Townley soils, and soils that have a fragipan that restricts the rooting depth, such as Wynnville soils. Erosion results in the sedimentation of streams. Erosion control on farmland minimizes this pollution and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion-control practices provide a protective cover, reduce the runoff rate, and increase the rate of water infiltration. A cropping system that keeps a plant cover or crop residue on the surface for extended periods can hold soil losses to amounts that will not reduce the productive capacity of the soils. In sloping areas on livestock farms, including grasses and legumes in the cropping system reduces the hazard of erosion. The grasses and legumes also improve tilth and provide some nitrogen for the crops that follow in the rotation.

Applying a system of conservation tillage and returning crop residue to the soil increase the rate of water infiltration and reduce the hazards of runoff and erosion. No-till farming of corn, soybeans, and grain sorghum effectively reduces the hazard of erosion in sloping areas. It is suitable on most of the soils in the county and can be used in fields that are not suitable for terracing and farming on the contour.

Terraces and diversions shorten the length of slopes and thus help to control runoff and erosion. They are most practical on deep, sloping soils, such as Allen, Spadra, Whitwell, and Wynnville soils. Some of the soils in Walker County, such as Townley soils, are poorly suited to terracing because a clayey subsoil would be exposed in the terrace channel. Diversions intercept surface runoff from hilly uplands and divert the water around fields on toe slopes at a lower elevation.

Contour farming effectively reduces the hazard of erosion in cultivated areas. It is best suited to soils that have smooth, uniform slopes.

Information about the design of erosion-control structures is available at the local office of the Soil Conservation Service.

The amount of rainfall needed for the crops commonly grown in Walker County is adequate; however, distribution of the rainfall during spring and summer generally is such that periods of drought occur during the growing season in most years. Irrigation generally helps to prevent droughtiness. Most of the soils commonly used for cultivated crops are suited to irrigation. In Townley and other soils, however, a slow infiltration rate limits the suitability for irrigation. Wet soils, such as Whitwell soils, rarely require irrigation.

Seedbed preparation and cultivation are difficult in eroded areas of clayey soils because the original friable surface layer has been removed. Additional tillage may be needed to disrupt soil aggregates. It commonly is needed in areas of Townley soils.

Most of the soils that are used for crops in Walker County have a surface layer of fine sandy loam, sandy loam, loam, or silt loam that is light in color and low in organic matter content. Soils that have a high content of silt and a weak structure in the surface layer are subject to crusting after periods of intense rainfall. The crust is hard when dry and is almost impervious to water. It reduces the rate of water infiltration and increases the runoff rate. Regular additions of crop residue, manure, and other organic material can improve soil structure and minimize crusting.

The use of large tractors and heavy equipment results in a compact layer in some soils. Such a layer, or a traffic pan, is normally 2 to 12 inches below the surface. It restricts the rate of water infiltration and the growth of plant roots. Soils that are likely to develop a traffic pan include Allen, Sipsey, and Nauvoo soils.

Tilth is an important factor affecting seed germination and the infiltration of water into the soil. Tilth is good in soils that have a granular and porous surface layer. Farming methods and the degree of erosion affect tilth.

Soil fertility is naturally low in most of the soils in Walker County. Soils on flood plains and terraces, such as Pruitton, Spadra, and Whitwell soils, are higher in natural fertility than most soils on uplands. All natural soils in the county require applications of ground limestone to neutralize soil acidity. Crops on all soils in the county respond well to applications of fertilizer. Available phosphorus and potash levels are generally low in most of the soils. In some fields, however, a buildup of phosphorus or potassium has resulted from heavy applications of commercial fertilizer. Additions of lime and fertilizer to all soils should be based on the results of soil tests, on the needs of crops, and on the expected level of yields. The Cooperative Extension Service can help to determine the kind and amount of fertilizer and lime to be applied.

Wetness is a problem on several soils in the county, including Whitwell and Mooreville soils. Some soils are naturally too wet for the crops and pasture plants that are commonly grown in the county. A drainage system, however, increases crop and pasture production on other soils, such as Whitwell soils. Surface drainage

systems reduce the amount of water that accumulates on the soil. Subsurface drainage systems lower the water table.

Many areas of well drained or moderately well drained soils are seepy near drainageways. Farming activities are often delayed because the soils directly adjacent to the drainageways are wet in the spring. Subsurface drainage systems remove excess water from the wet areas. Underground drainage systems can intercept seepage water on toe slopes and divert it from the lower parts of the cropland.

The design of surface and subsurface drainage systems depends on the properties of the soil. A combination of surface drains and tile drainage is needed on some soils. The drainage tile lines should be more closely spaced in slowly permeable soils than in the more permeable soils.

Pasture and hay crops are important in the county. Tall fescue, common bermudagrass, and hybrid bermudagrasses are the main perennial grasses grown for pasture and hay. Wheat, ryegrass, and rye are grown for annual cool-season forage. Millet, sorghum, and hybrid forage sorghum provide most of the annual warm-season forage. The annuals normally are grown for temporary grazing on cropland. Arrowleaf clover, white clover, crimson clover, and other cool-season forage legumes are grown on several soils in the county, especially if agricultural limestone is applied. Most of the soils used for pasture are well suited to warm-season forage legumes, such as sericea and annual lespedeza.

A proper grazing system or a proper cutting height, weed control, applications of fertilizer, rotation grazing, and properly distributed animal droppings are needed on soils used for pasture and hay. Mooreville soils are suited to summer grazing but are too wet for grazing in winter and early in spring. Cool-season perennial grasses, such as tall fescue, should not be grazed in summer, when food reserves can be stored in the plants for growth in the fall. Overgrazing and low fertility are the main concerns affecting forage production. They result in weak plants and poor stands that are quickly infested with weeds. Maintaining a dense cover of desirable pasture plants helps to prevent the establishment of weeds.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c.*

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 6.

Landscaping and Gardening

Kenneth M. Rogers, conservation agronomist, Soil Conservation Service, helped prepare this section.

Most of the acreage in residential areas is used as sites for houses, driveways, and streets. The rest of each lot is commonly used for a plant cover to prevent excessive erosion and enhance the appearance of the home, vegetable or flower gardens and shrubs, fruit and nut orchards, recreation, habitat for birds and other wildlife, shade for energy conservation, vegetation and structures to abate undesirable noise and the wind, and septic tank absorption fields. Careful planning and a good understanding of the soil are needed for land use around the home.

This section provides general soil-related information about landscaping and gardening on homesites. The Soil Conservation Service, the Cooperative Extension Service, and private lawn, garden, nursery, fertilizer, and seed businesses can provide other information, especially that which is not directly soil related. Because the amount of information needed about soils in some areas is too detailed and is beyond the scope and map scale of this survey, onsite investigations are needed to supplement the information in this survey and elsewhere.

Most of the soils in the residential areas of Walker County have been disturbed to some degree during the construction of houses, streets, driveways, and utility services. These disturbances involved cutting and filling, grading, excavating, and blasting. Soil properties are more varied and less predictable than they were before the surface was disturbed. As a result, onsite examination is necessary in planning land use.

Bankhead, Montevallo, Sunlight, and Townley are among the soils most poorly suited to plant growth. The surface layer of these soils was removed during grading, which exposed a dense, firm subsoil that restricts root penetration, absorbs little rainfall, and causes excessive runoff. These conditions are common where these and similar soils are mapped in complexes with Urban land. Incorporating organic matter into the soils improves tilth, increases the rate of water infiltration, and results in a more desirable rooting medium. Soils that are subject to intensive foot traffic should be protected by mulch, such as pine bark, wood chips, and gravel.

The wetness of Mooreville and other soils limits the kinds of plants that can be grown to those that can withstand excessive moisture. In the more permeable soils, the wetness can be reduced by underground tile drains, which lower the water table.

Most garden and landscape plants can be grown in areas of Spadra, Whitwell, and other soils on flood plains. The effects of floodwater on these plants, however, should be considered. Drainage is a management concern because surface runoff increases the frequency and amount of flooding in urban watersheds. The Soil Conservation Service, municipal and county engineering departments, and private engineering companies can provide assistance in solving drainage problems.

A limited depth to bedrock and rock fragments in the soil affect the kinds of plants that can be grown. Cutting and filling sometimes expose the bedrock and restrict the root zone. In areas of Sunlight soils, which are naturally shallow over bedrock, removal of any soil

material decreases the depth of the root zone.

Some soils, such as Montevallo and Sunlight soils, have many rock fragments. The content of these fragments increases with increasing depth. As the content of rock fragments increases, root growth is restricted and the available water capacity is reduced. In many disturbed areas broken concrete, brick, and other debris are buried under soil material. In these areas the soil generally is too shallow or has properties that are too poor to support many plants. Applications of topsoil generally are needed to provide an adequate rooting medium for plants, especially in areas used for landscaping and gardening.

Natural fertility is low in most of the soils in Walker County. Most of the soils are strongly acid or very strongly acid. Additions of ground limestone generally are needed. The surface layer has the highest content of plant nutrients and the best pH level for most plants. In many areas applying lime and fertilizer increases the fertility of the surface layer. If the surface layer is removed during construction, the underlying soil is very acid and extremely low in content of plant nutrients. Also, many nutrients are not available for plant growth in acid soils. Disturbed soils generally require much larger amounts of lime and fertilizer than other soils. The kind and amount of lime and fertilizer should be based on the results of soil tests and the type of plants to be grown. The Soil Conservation Service, the Cooperative Extension Service, and many fertilizer businesses can provide information about sampling for soil testing.

The grasses commonly used in landscaping in Walker County are mainly propagated grasses, such as zoysia, hybrid bermudagrass, centipedegrass, and seeded grasses, such as fescue, common bermudagrass, bluegrass, and centipedegrass. The grasses commonly used for short-term cover include ryegrass, rye, wheat, sudangrass, and millet.

The propagated plants generally are planted as sprigs, plugs, or solid sodding. Topsoil can be applied before planting. Lime and fertilizer should be applied and incorporated into the soil. The plants should be placed in close contact with the soil. They should be watered so that the root system becomes well established. Centipedegrass and the strains of zoysia are characterized by moderate shade tolerance; however, zoysia normally requires more maintenance. The strains of hybrid bermudagrass are fast growing but are not characterized by the shade tolerance of centipedegrass and zoysia.

The most common perennial grasses established by seeding are fineleaf fescue and bluegrass in cool-season lawns and common bermudagrass and centipedegrass in warm-season lawns. Lime and fertilizer should be applied before seeding and incorporated into the soil. A proper planting depth is important in establishing grasses from seed.

A short-term plant cover protects the soil at construction sites or provides a cover between the planting seasons of the desired grass species. The grasses most commonly planted for short-term cover are ryegrass in cool seasons and sudangrass and millet in warm seasons. These annuals die after the growing season.

Lime and fertilizer should be applied periodically in areas of all types of grasses. The kind and amount to be applied should be based on the results of soil tests.

Vines are an important plant cover in moderately shaded areas and on steep slopes that cannot be mowed. Groundivy and periwinkle can be used for ground cover in these areas, in areas of rock outcrop, and on walls and fences. These plants are propagated generally from potted plants or sprigs.

Mulch can be used as ground cover in areas where traffic is too heavy for a grass cover, in areas where shrubs and flowers require additional cover, and in densely shaded areas. Mulch provides effective ground cover and immediate cover for erosion control in areas where vegetation is not desired. Effective mulches include pine straw, small grain straw, hay, composted grass clippings, wood chips, pine bark, rocks, and several manufactured materials. The kind of mulch that should be used depends somewhat on the hazard of erosion. Mulch not only helps to control erosion but also conserves soil moisture and controls weeds around trees, shrubs, and flowers.

Shrubs are used mainly to enhance the appearance of homesites and to control traffic. They can effectively lessen the impact of raindrops and of runoff from the roofs of houses. Most native and adapted plants add variety to residential settings. Reaction to acidity and fertility levels varies greatly among shrub types.

Vegetable and flower gardens are important to many individuals and businesses. In some areas, however, homes and businesses are not located on soils that are suited to vegetables and flowers. Unless topsoil is applied, productivity can be limited on soils that have been disturbed by construction. Soils that have a slope of more than 8 percent are poorly suited to vegetable gardening because erosion is a hazard if the soils are tilled. Steep soils generally have a thin surface layer. Flower gardens can be established on these soils if mulch is used to control erosion. If composted tree leaves and grass clippings have been incorporated into the soil, gardens generally are fertile and friable and have a good moisture content.

Most garden plants grow best on soils that have a pH between 5.5 and 6.5. The fertility level should be high.

A soil test is the only effective means of determining how much and what type of fertilizer to be applied.

Trees are important in landscaping homesites. Information about trees is available in the section "Woodland Management and Productivity." The Alabama Forestry Commission can provide special assistance in urban forestry.

Woodland Management and Productivity

Jerry L. Johnson, forester, Soil Conservation Service, helped prepare this section.

About 399,500 acres in Walker County, or more than 77 percent of the total acreage, is commercial forest land. The acreage of this land increased by 8 percent from 1972 to 1982 as a result of tree planting on marginal land and reforestation of idle land and surface-mined areas.

Farmers own about 20 percent of the forest land in Walker County, and miscellaneous private landowners own about 70 percent. The forest industry owns 8 percent. The other 2 percent is public forest land.

The forest types in Walker County include 168,800 acres of loblolly pine-shortleaf pine, 56,300 acres of oak-pine, 163,200 acres of oak-hickory, 5,600 acres of oak-gum-cypress, and 5,600 acres of nonstocked forest land. The forest land includes 135,000 acres of sawtimber, 140,700 acres of poletimber, 118,200 acres of seedlings and saplings, and 5,600 nonstocked acres *(17)*.

On about 320,000 acres, the site index for loblolly pine is 80 or more. The soils are best suited to pine on about 371,400 acres, to upland hardwoods on 22,500 acres, and to bottom land hardwoods on 5,600 acres *(17)*.

Forestry is of major importance in the economy of Walker County. The value of timber products at the primary processing plant was 10,201,000 dollars in 1983 *(1)*. In 1982, forestry accounted for 36 percent of the total revenue derived from forestry and agricultural commodities *(12)*.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. The common forest understory plants also are listed. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight*, *moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Table 7 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation affecting use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *D* indicates a soil that has a limitation because of a restricted rooting depth, such as a shallow soil that is underlain by hard bedrock, a fragipan, or other layers that restrict roots. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the profile. The letter *A* indicates a soil having no significant limitations that affect forest use and management. If a soil has more than one limitation, the priority is as follows: R, W, D, and C.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On

the steeper slopes, tracked equipment must be used. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic features. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. Rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of *moderate* or *severe* indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A *moderate* or *severe* rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate. The first tree listed for each soil is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The estimates of the productivity of the soils in this survey are based on published data *(5, 6, 7, 8, 9, 13)*.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year, calculated at the age of culmination of mean annual increment.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

In table 8, the soils of the survey area are rated according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Robert E. Waters, biologist, Soil Conservation Service, helped prepare this section.

Walker County supports a variety of game animals, nongame wildlife, and furbearers. The most common game species are bobwhite quail, cottontail rabbit, various species of ducks, gray squirrel, mourning dove, white-tailed deer, and wild turkey. The most common nongame species are blackbirds, bluebirds, blue jays, cardinals, crows, egrets, herons, meadowlarks, mockingbirds, sparrows, snakes, thrushes, vireos, warblers, and woodpeckers. The most common furbearers are beaver, bobcat, coyote, fox, mink, muskrat, otter, and raccoon.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and

other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, soybeans, sorghum, millet, cowpeas, and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, clover, alfalfa, Johnsongrass, lespedeza, orchardgrass, and vetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are dewberry, blackberry, croton, pokeweed, partridge pea, crabgrass, and paspalum.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, yellow poplar, cherry, sweetgum, persimmon, sassafras, sumacs, hawthorn, dogwood, hickory, black walnut, holly, beech, and hackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are pyracantha, autumn olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and cypress.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, beaver ponds, and other wildlife ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, mourning dove, meadowlark, mockingbird, killdeer, blackbirds, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, warblers, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, rails, kingfishers, muskrat, mink, otter, turtles, and beaver.

Aquaculture

H.D. Kelly, biologist, Soil Conservation Service, helped prepare this section.

Aquaculture is the controlled production and harvest of animals or plants grown in or on water. In Walker County channel catfish farming and sport fish production of bass and bream are the most common kinds of aquaculture. The channel catfish is produced either in cages in ponds or directly in the ponds. Pond culture is the most common method used in the county. Less than 100 acres is used for pond culture of catfish. The county has more than 1,360 acres of bass and bream ponds. Other species of fish are being studied for stocking in ponds, and in the future, fish farming promises to be an excellent source of added income for those who own land that has suitable physical features.

Ponds are the foundation of fish farming. The suitability of soils as sites for ponds helps to determine the success of fish farming or other aquacultural practices. The tables in this survey are useful in ascertaining the suitability of the soils as sites for ponds. Table 13 indicates the soil limitations that affect pond reservoir areas and embankments, dikes, and levees. Table 16 indicates the frequency of flooding and the depth to a water table. These tables and a soil map can help in evaluating a selected site for its pond-building and water-retaining potential. The map units, however, can include soils that are not alike; therefore, knowledge of soil characteristics and pond design and construction is needed to determine the true potential of a site. Areas of Allen, Mooreville, Spadra, Townley, Whitwell, and Wynnville soils are generally good sites for pond construction.

Access and building construction are also considerations in evaluating the site for pond construction. Depending on the size and planned use of the site, road systems should be designed so that they accommodate harvest trucks, large commercial trucks, and smaller trucks for fingerling farms. A feed truck or similar equipment also requires suitable access to the fish farm. If the farm is planned for fingerling production, a hatchery building will probably be on the site. Other buildings may be needed to store equipment or feed. The soil limitations that affect roads and buildings are indicated in table 10.

Another factor in aquaculture is the influence of soil on the quality of water in the ponds. Several variables of water quality affect the production of fish. Total alkalinity is a variable that is directly influenced by the soil. Total alkalinity values of 30 to 150 parts per million are preferred. If they are well fed, fish can be produced in ponds that have alkalinity values of less than 20 parts per million. Other complicating factors, however, affect fish production when alkalinity values are less than 20 parts per million.

Agricultural lime commonly can prevent the production problems associated with low alkalinity values. Analysis of the soil in the pond basins should be made before lime is applied and the basins are filled with water. The amount of lime should be based on the results of this analysis. The lime should be applied before water is introduced into the ponds. Thereafter, annual applications of lime, even in ponds full of water, should range from 20 to 25 percent of that originally applied to maintain desirable levels of alkalinity. The value of proper alkalinity levels in fish culture cannot be overemphasized. All of the soils in Walker County that are suitable for pond construction require applications of lime.

The source and amount of water should be considered before a pond is constructed. For example, if runoff water is to be used, the watershed must also be evaluated. The local office of the Soil Conservation Service or the Cooperative Extension Service can provide technical assistance in solving site and production problems.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed

performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreation uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a slowly permeable layer, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a slowly permeable layer, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a slowly permeable layer, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a slowly permeable layer, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a slowly permeable layer, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, and soil reaction affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover

for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and depth to the water table is less than 1 foot. These soils may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are naturally fertile or respond well to fertilizer and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an

appreciable amount of gravel or stones, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or stones, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; and susceptibility to flooding. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a slowly permeable layer, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution, liquid limit, and plasticity index (Atterberg limits), the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(4)* and the system adopted by the American Association of State Highway and Transportation Officials *(3)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates

determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The

change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than a month). The time of year that floods are most likely to occur is expressed in months.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a

seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 17 and the results of chemical analysis in table 18. The data are for soils sampled at carefully selected sites. Soil samples were analyzed by the Agronomy and Soils Mineralogy Laboratory, Auburn University, Auburn, Alabama.

Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(18).*

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).

Extractable bases, extractable acidity, and *base saturation*—methods of Hajek, Adams, and Cope *(10).*

Reaction (pH)— 11:1 water dilution (8C1a).

Cation-exchange capacity—sum of cations (5A3a).

Cation-exchange capacity—ammonium chloride (5A7a).

Engineering Index Test Data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Alabama Highway Department, Bureau of Materials and Tests, Montgomery, Alabama.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(15)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 20 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udults*, the suborder of the Ultisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, siliceous, thermic, Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the underlying material within a series. The Nauvoo series is an example of fine-loamy, siliceous, thermic, Typic Hapludults.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (14)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (15)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Allen Series

The Allen series consists of deep, well drained, moderately permeable soils that formed in material

weathered chiefly from sandstone. These soils are on gently sloping and moderately sloping foot slopes. Slopes range from 4 to 10 percent. The soils are fine-loamy, siliceous, thermic Typic Paleudults.

Allen soils are geographically associated with Montevallo, Nauvoo, Sunlight, Townley, and Whitwell soils. Montevallo, Nauvoo, Sunlight, and Townley soils have a solum that is thinner than that of the Allen soils. They are on the steeper slopes above the Allen soils. Whitwell soils are on low terraces and in drainageways and are subject to periodic flooding. They are moderately well drained.

Typical pedon of Allen loam, 4 to 10 percent slopes, 1,300 feet north and 1,450 feet east of the southwest corner of sec. 17, T. 13 S., R. 5 W.

A—0 to 6 inches; dark brown (10YR 4/3) loam; weak fine granular structure; very friable; common fine and few medium roots; strongly acid; clear smooth boundary.

BE—6 to 11 inches; yellowish brown (10YR 5/6) fine sandy loam; weak fine subangular blocky structure; friable; few fine and medium roots; strongly acid; clear wavy boundary.

Bt1—11 to 30 inches; red (2.5YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; few medium roots; thin patchy clay films on faces of most peds; strongly acid; clear wavy boundary.

Bt2—30 to 41 inches; red (2.5YR 4/6) sandy clay loam; few medium distinct brownish yellow (10YR 6/8) and strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few medium roots; thin patchy clay films on faces of most peds; very strongly acid; clear wavy boundary.

Bt3—41 to 64 inches; red (2.5YR 4/8) clay loam; common medium distinct reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; friable and firm; thin patchy clay films on faces of peds; very strongly acid.

The thickness of the solum ranges from 60 to more than 80 inches. The depth to bedrock is more than 72 inches. Reaction is very strongly acid or strongly acid throughout the profile unless the surface layer has been limed.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is sandy loam or loam.

The BE or BA horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. It is fine sandy loam or loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. In most pedons the lower part of this horizon is mottled in shades of red, yellow, or brown. This horizon is sandy clay loam or clay loam.

Bankhead Series

The Bankhead series consists of moderately deep, well drained, moderately rapidly permeable soils that formed in residuum and colluvium derived from sandstone. These soils are on moderately steep to very steep side slopes. Slopes range from 15 to 60 percent. The soils are coarse-loamy, siliceous, thermic Typic Dystrochrepts.

Bankhead soils are geographically associated with Nauvoo, Nectar, Sipsey, Sunlight, and Townley soils. Nauvoo and Sipsey soils have a fine-loamy argillic horizon. They are on ridgetops, the upper slopes, and benches. Nectar and Townley soils have a clayey argillic horizon. Nectar soils are on the less sloping ridgetops, and Townley soils are on the less sloping side slopes and ridges. Sunlight soils are shallower over bedrock than the Bankhead soils. They are in landscape positions similar to those of the Bankhead soils.

Typical pedon of Bankhead sandy loam, in an area of Sipsey-Bankhead complex, 15 to 45 percent slopes, 1,375 feet east and 200 feet south of the northwest corner of sec. 23, T. 12 S., R. 9 W.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; very friable; common fine and medium roots; about 10 percent, by volume, small sandstone channers 2 to 20 millimeters in size; strongly acid; clear wavy boundary.

Bw1—4 to 13 inches; brownish yellow (10YR 6/6) channery sandy loam; weak fine subangular blocky structure; very friable; common medium roots; about 20 percent, by volume, sandstone channers 2 to 30 millimeters in size; strongly acid; gradual wavy boundary.

Bw2—13 to 26 inches; yellowish brown (10YR 5/6) cobbly sandy loam; weak fine subangular blocky structure; very friable; few medium roots; about 33 percent, by volume, sandstone cobbles 3 to 10 inches in size; strongly acid; abrupt irregular boundary.

R—26 inches; fractured, hard, yellowish brown sandstone; loamy material in the cracks.

The thickness of the solum and the depth to hard bedrock range from 20 to 40 inches. Reaction is very strongly acid or strongly acid throughout the profile unless the surface layer has been limed.

The A horizon has hue of 10YR, value of 3 or 4, and

chroma of 1 or 3. It is less than 5 inches thick. It is sandy loam, fine sandy loam, loamy sand, or the channery or cobbly analogs of those textures. The content of coarse fragments ranges, by volume, from 5 to 25 percent.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 4 to 8. It is sandy loam or gravelly, channery, or cobbly sandy loam. The content of coarse fragments ranges, by volume, from 5 to 35 percent.

The R horizon is hard to weathered sandstone. Soil material is in the cracks between the rocks.

Brilliant Series

The Brilliant series consists of deep, somewhat excessively drained, moderately rapidly permeable soils that formed in medium acid to alkaline spoil material in sloping to very steep areas that have been strip-mined for coal. Slopes range from 6 to 60 percent. The soils are loamy-skeletal, mixed, nonacid, thermic Typic Udorthents.

Brilliant soils are geographically associated with Palmerdale soils. Palmerdale soils are more acid than the Brilliant soils. They are in landscape positions similar to those of the Brilliant soils. Brilliant soils are commonly adjacent to nearly all of the other soils in the survey area. The adjacent soils are better developed than the Brilliant soils and have a lower content of coarse fragments throughout. They are in undisturbed areas.

Typical pedon of Brilliant extremely channery loam, in an area of Brilliant and Palmerdale extremely channery loams, 6 to 60 percent slopes, 1,800 feet east and 1,000 feet south of the northwest corner of sec. 17, T. 14 S., R. 8 W.

Ap—0 to 5 inches; grayish brown (10YR 5/2) extremely channery loam; massive; friable; about 75 percent coarse siltstone and sandstone fragments ranging from ⅛ inch to more than 60 inches in diameter; neutral; gradual wavy boundary.

C—5 to 60 inches; dark grayish brown (10YR 4/2) extremely channery loam; massive; friable; about 80 percent coarse fragments, mainly siltstone fragments and some sandstone fragments, ranging from ⅛ inch to more than 60 inches in diameter; neutral.

The spoil material is more than 60 inches thick. Reaction ranges from medium acid to neutral throughout the profile. The content of coarse fragments ranges, by volume, from 60 to 90 percent in the Ap and C horizons. Sandstone, siltstone, and shale fragments range from about ⅛ inch to more than 60 inches in diameter.

The Ap horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 5, and chroma of 1 or 2. It is extremely channery loam unless the original soil material has been replaced during reclamation.

The C horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 or 4, and chroma of 1 or 2. The fine-earth fraction is mainly loam, but the range includes silt loam.

Montevallo Series

The Montevallo series consists of shallow, well drained, moderately permeable soils that formed in material weathered from interbedded sandstone, siltstone, and shale. These soils are on steep and very steep side slopes and on narrow ridgetops on uplands. Slopes range from 30 to 60 percent. The soils are loamy-skeletal, mixed, thermic, shallow Typic Dystrochrepts.

Montevallo soils are geographically associated with Nauvoo, Nectar, Sipsey, Sunlight, and Townley soils. The associated soils have a solum more than 20 inches thick. Nectar and Townley soils have a clayey argillic horizon. They are on ridgetops and the upper side slopes. Nauvoo and Sipsey soils have a fine-loamy argillic horizon. Nauvoo soils are on ridgetops. Sunlight soils have an argillic horizon. Sipsey and Sunlight soils are on side slopes.

Typical pedon of Montevallo channery silt loam, 30 to 60 percent slopes, 2,600 feet west and 500 feet north of the southeast corner of sec. 4, T. 16 N., R. 6 W.

A—0 to 3 inches; dark yellowish brown (10YR 4/4) channery silt loam; weak fine granular structure; friable; many fine and medium roots; about 20 percent siltstone fragments; strongly acid; clear wavy boundary.

Bw1—3 to 5 inches; yellowish brown (10YR 5/4) very channery loam; weak fine subangular blocky structure; friable; many fine and medium roots; about 35 percent siltstone fragments; strongly acid; clear wavy boundary.

Bw2—5 to 12 inches; strong brown (7.5YR 5/6) extremely channery loam; weak fine subangular blocky structure; friable; many medium roots; about 70 percent siltstone and sandstone fragments; very strongly acid; gradual wavy boundary.

Cr—12 to 60 inches; yellowish brown (10YR 5/6), weathered, fractured siltstone and sandstone; less than 5 percent, by volume, Bw material in the cracks in the upper part.

The thickness of the solum and depth to the Cr horizon range from 10 to 20 inches. Reaction is very strongly acid or strongly acid throughout the profile unless the surface layer has been limed.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 4. It is less than 5 inches thick. It is the channery or very channery analogs of silt loam or loam. The content of coarse fragments ranges, by volume, from 15 to 40 percent.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. It is the very channery or extremely channery analogs of silt loam, loam, or silty clay loam. The content of coarse fragments ranges, by volume, from 35 to 85 percent.

The Cr horizon is weakly consolidated or fractured siltstone and sandstone. Pockets of soil material are along the cracks in the upper part of this horizon.

Mooreville Series

The Mooreville series consists of deep, moderately well drained, moderately permeable soils that formed in alluvium weathered from sandstone, siltstone, and shale. These soils are on nearly level flood plains and are frequently flooded. Slopes are 0 to 1 percent. The soils are fine-loamy, siliceous, thermic Fluvaquentic Dystrochrepts.

Mooreville soils are geographically associated with Pruitton, Spadra, and Whitwell soils. Pruitton soils are well drained. They are in landscape positions similar to those of the Mooreville soils. Spadra and Whitwell soils have an argillic horizon. They are on low terraces.

Typical pedon of Mooreville silt loam, 0 to 1 percent slopes, frequently flooded, 2,200 feet west and 1,400 feet south of the northeast corner of sec. 3, T. 13 S., R. 8 W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine granular structure; very friable; common very fine and fine roots; strongly acid; clear wavy boundary.

Bw1—8 to 17 inches; yellowish brown (10YR 5/4) loam; few medium distinct light brownish gray (2.5Y 6/2) mottles and strong brown (7.5YR 5/6) stains along pores and root channels; weak fine subangular blocky structure; very friable; few fine roots; strongly acid; clear wavy boundary.

Bw2—17 to 33 inches; mottled light brownish gray (2.5Y 6/2), light olive brown (2.5Y 5/4), and strong brown (7.5YR 5/6) loam; weak medium subangular blocky structure; very friable; strongly acid; gradual wavy boundary.

Bw3—33 to 45 inches; mottled yellowish brown (10YR 5/4) and light gray (2.5Y 7/2) loam; weak medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.

C—45 to 60 inches; mottled gray (10YR 6/1) and yellowish brown (10YR 5/4) clay loam; massive; friable; neutral.

The thickness of the solum ranges from 40 to more than 60 inches. Reaction is very strongly acid or strongly acid throughout the profile unless the surface layer has been limed.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is silt loam, fine sandy loam, or loam.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 or 4 or is mottled in shades of brown, gray, or red. It is loam, clay loam, sandy clay loam, or silty clay loam.

The C horizon is mottled in shades of brown or gray or is gray with mottles in shades of brown. It is loam, sandy loam, clay loam, or sandy clay loam.

Nauvoo Series

The Nauvoo series consists of deep, well drained, moderately permeable soils that formed in material weathered from sandstone or sandstone interbedded with siltstone or shale. These soils are on gently sloping to moderately steep ridgetops, the upper slopes, and benches. Slopes range from 2 to 20 percent. The soils are fine-loamy, siliceous, thermic Typic Hapludults.

Nauvoo soils are geographically associated with Nectar, Sipsey, Sunlight, Townley, and Wynnville soils. Nectar and Townley soils have a clayey argillic horizon. They are in landscape positions similar to those of the Nauvoo soils. Wynnville soils have a fragipan. They are on terraces. Sipsey soils have a solum that is 20 to 40 inches thick and have a yellower hue than the Nauvoo soils. Sunlight soils have a loamy-skeletal control section. Sipsey and Sunlight soils are on side slopes.

Typical pedon of Nauvoo fine sandy loam, in an area of Nauvoo and Nectar fine sandy loams, 2 to 6 percent slopes, 2,700 feet north and 280 feet west of the southeast corner of sec. 27, T. 12 S., R. 10 W.

Ap—0 to 4 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; friable; common fine and medium roots; very strongly acid; abrupt wavy boundary.

Bt1—4 to 13 inches; red (2.5YR 4/8) clay loam; moderate medium subangular blocky structure; friable; few fine and common medium roots; about 5 percent sandstone fragments; thin patchy clay films on faces of most peds; very strongly acid; clear wavy boundary.

Bt2—13 to 25 inches; red (2.5YR 4/8) clay loam; few medium distinct strong brown (7.5YR 5/6) mottles;

moderate medium subangular blocky structure; friable; few medium roots; about 8 percent sandstone fragments; patchy clay films on faces of most peds; very strongly acid; gradual wavy boundary.

Bt3—25 to 33 inches; yellowish red (5YR 5/6) sandy clay loam; common medium faint strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; about 8 percent sandstone fragments; patchy clay films on faces of some peds; very strongly acid; gradual wavy boundary.

BC—33 to 42 inches; mottled yellowish red (5YR 5/6) and strong brown (7.5YR 5/6) fine sandy loam; weak medium subangular blocky structure; friable; about 15 percent sandstone fragments; patchy clay films on faces of some peds; very strongly acid; gradual irregular boundary.

Cr—42 to 60 inches; mottled, level-bedded, massive, weathered sandstone.

The thickness of the solum ranges from 30 to 50 inches, and the depth to weathered bedrock ranges from 40 to 60 inches. Reaction ranges from very strongly acid to medium acid throughout the profile unless the surface layer has been limed.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is sandy loam, fine sandy loam, or loam.

Some pedons have a BE horizon. This horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is sandy loam, fine sandy loam, or loam.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It generally is mottled in shades of red, brown, or yellow in the lower part. It is loam, sandy clay loam, or clay loam. In most pedons the content of coarse fragments ranges, by volume, from 0 to 8 percent.

Most pedons have a BC horizon. This horizon has colors similar to those of the Bt horizon or is mottled in shades of red or brown. It is fine sandy loam, loam, or sandy clay loam.

The Cr horizon is level-bedded, weathered sandstone or sandstone interbedded with siltstone or shale. It has colors in shades of red, yellow, brown, or gray. The sandstone generally can be ripped with hand equipment, but it is harder in some areas.

Nectar Series

The Nectar series consists of deep, well drained, moderately slowly permeable soils that formed in material weathered from sandstone and siltstone. These soils are on gently sloping ridgetops and side slopes. Slopes range from 2 to 6 percent. The soils are clayey, kaolinitic, thermic Typic Hapludults.

Nectar soils are geographically associated with Nauvoo, Sipsey, Sunlight, Townley, and Wynnville soils. Nauvoo and Sipsey soils have a fine-loamy control section. Nauvoo soils are in positions on the ridgetops similar to those of the Nectar soils. Wynnville soils have a fragipan. They are on terraces. Sunlight soils have a loamy-skeletal control section. Sipsey and Sunlight soils are on side slopes. Townley soils have mixed mineralogy and are slightly deeper over bedrock than the Nectar soils. They are in landscape positions similar to those of the Nectar soils.

Typical pedon of Nectar fine sandy loam, in an area of Nauvoo and Nectar fine sandy loams, 2 to 6 percent slopes, 2,600 feet north and 250 feet west of the southeast corner of sec. 27, T. 12 S., R. 10 W.

Ap—0 to 5 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; friable; common fine roots; few small sandstone fragments; strongly acid; abrupt smooth boundary.

Bt1—5 to 16 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; friable; common fine and medium roots; few sandstone fragments; continuous clay films on faces of some peds; very strongly acid; gradual smooth boundary.

Bt2—16 to 32 inches; red (2.5YR 4/6) clay loam; moderate medium subangular blocky structure; friable; few fine roots; few sandstone fragments; continuous clay films on faces of some peds; very strongly acid; gradual smooth boundary.

Bt3—32 to 45 inches; yellowish red (5YR 4/6) sandy clay loam; many medium faint red (2.5YR 4/6) and common medium faint strong brown (7.5YR 5/8) mottles; weak medium and coarse subangular blocky structure; friable; about 10 percent sandstone fragments; patchy clay films on faces of some peds; strongly acid; clear smooth boundary.

Cr—45 to 60 inches; red, yellow, and brown, level-bedded, weathered sandstone.

The thickness of the solum and the depth to weathered bedrock range from 40 to 60 inches. Reaction is very strongly acid or strongly acid throughout the profile unless the surface layer has been limed.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is fine sandy loam or loam. The content of coarse fragments ranges, by volume, from 0 to 5 percent.

Some pedons have a BE horizon. This horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It is loam. The content of coarse fragments

ranges, by volume, from 0 to 8 percent.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. In some pedons it is mottled in shades of red, yellow, or brown. It is silty clay loam, clay loam, clay, or sandy clay loam. The content of coarse fragments ranges, by volume, from 0 to 10 percent.

Some pedons have a BC horizon. This horizon has colors similar to those of the Bt horizon, but it is mottled in shades of red, brown, or yellow. It is silty clay loam or clay loam. The content of coarse fragments ranges, by volume, from 0 to 15 percent.

The Cr horizon is level-bedded, weathered sandstone or interbedded sandstone and siltstone. It has colors in shades of red, yellow, gray, or brown. Although the degree of weathering varies from pedon to pedon, this horizon generally can be ripped with heavy machinery.

Palmerdale Series

The Palmerdale series consists of deep, somewhat excessively drained, moderately rapidly permeable soils that formed in acid spoil material in sloping to very steep areas that have been surface strip-mined for coal. Slopes range from 6 to 60 percent. The soils are loamy-skeletal, mixed, acid, thermic Typic Udorthents.

Palmerdale soils are geographically associated with Brilliant soils. Brilliant soils are less acid than the Palmerdale soils. Palmerdale soils are commonly adjacent to nearly all of the other soils in the survey area. The adjacent soils are better developed than the Palmerdale soils and have a lower content of coarse fragments throughout. They are in undisturbed areas.

Typical pedon of Palmerdale extremely channery loam, in an area of Brilliant and Palmerdale extremely channery loams, 6 to 60 percent slopes, 2,000 feet west and 1,600 feet south of the northeast corner of sec. 33, T. 14 S., R. 6 W.

Ap—0 to 6 inches; dark grayish brown (2.5Y 4/2) extremely channery loam; weak medium granular structure; friable; few fine roots; about 70 percent randomly oriented coarse fragments, mostly channery siltstone; very strongly acid; gradual wavy boundary.

C—6 to 60 inches; dark grayish brown (2.5Y 4/2) extremely channery loam; weak medium granular structure; friable; about 80 percent randomly oriented coarse fragments, mostly siltstone; very strongly acid.

The mine spoil is more than 60 inches thick. Reaction ranges from extremely acid to strongly acid throughout the profile unless the surface layer has been limed. The content of coarse fragments ranges, by volume, from about 60 to 80 percent. The size of the fragments ranges from about 1/8 inch to 60 inches.

The A horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 to 6. The fine-earth fraction is loam or sandy loam.

The C horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 6. The fine-earth fraction is loam or silt loam.

Pruitton Series

The Pruitton series consists of deep, well drained, moderately rapidly permeable soils that formed in loamy alluvium derived from sandstone, siltstone, and shale. These soils are on nearly level and gently sloping flood plains. Slopes range from 0 to 2 percent. The soils are fine-loamy, siliceous, thermic Fluventic Dystrochrepts.

Pruitton soils are geographically associated with Mooreville, Spadra, and Whitwell soils. Mooreville soils are in the lower positions on the landscape and are moderately well drained. Spadra soils have an argillic horizon. They are in the higher positions on the landscape and are occasionally flooded. Whitwell soils have an argillic horizon and are moderately well drained. They are in the slightly higher, intermediate positions on the landscape.

Typical pedon of Pruitton loam, 0 to 2 percent slopes, frequently flooded, 550 feet east and 100 feet south of the northwest corner of sec. 32, T. 13 S., R. 9 W.

Ap—0 to 7 inches; yellowish brown (10YR 5/4) loam; weak fine granular structure; very friable; many fine roots; strongly acid; abrupt smooth boundary.

Bw1—7 to 25 inches; yellowish brown (10YR 5/4) loam; weak fine and medium subangular blocky structure; very friable; few fine roots in the upper part, decreasing in number with increasing depth; very strongly acid; clear wavy boundary.

Bw2—25 to 41 inches; yellowish brown (10YR 5/6) loam; common medium faint very pale brown (10YR 7/4) mottles; weak medium granular structure; very friable; very strongly acid; clear wavy boundary.

C1—41 to 59 inches; mottled yellowish brown (10YR 5/6), very pale brown (10YR 7/4), and dark yellowish brown (10YR 4/4) sandy loam; massive; very friable; very strongly acid; clear wavy boundary.

C2—59 to 64 inches; mottled yellowish brown (10YR 5/6), very pale brown (10YR 7/4), dark yellowish brown (10YR 4/4), and strong brown (7.5YR 5/8) sandy loam; massive; very friable; very strongly acid.

The thickness of the solum ranges from 30 to 50 inches. Reaction ranges from medium acid to very strongly acid throughout the profile unless the surface layer has been limed. Some pedons have sandstone or quartzite fragments.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. It is silt loam or loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 to 8. In some pedons the lower part of this horizon is mottled in shades of yellow or brown. This horizon is silt loam or loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6 or is mottled in shades of yellow, brown, or gray. It is stratified sandy loam, silt loam, or loam.

Some pedons have a 2C horizon. This horizon has colors and textures similar to those of the C horizon. The content of coarse chert fragments ranges, by volume, from 15 to 35 percent.

Sipsey Series

The Sipsey series consists of moderately deep, well drained, moderately permeable soils that formed in loamy material weathered from sandstone. These soils are on gently sloping to moderately steep ridgetops and side slopes. Slopes range from 4 to 30 percent. The soils are fine-loamy, siliceous, thermic Typic Hapludults.

Sipsey soils are geographically associated with Bankhead, Montevallo, Nauvoo, Sunlight, and Townley soils. Bankhead soils have a coarse-loamy control section. They are on side slopes. Nauvoo soils have a red, fine-loamy argillic horizon. They are in landscape positions similar to those of the Sipsey soils. Montevallo and Sunlight soils have a loamy-skeletal control section. They are on side slopes. Townley soils have a clayey argillic horizon. They are in landscape positions similar to those of the Sipsey soils.

Typical pedon of Sipsey loamy sand, 4 to 18 percent slopes, 900 feet west and 1,000 feet north of the southeast corner of sec. 35, T. 12 S., R. 7 W.

A—0 to 4 inches; brown (10YR 4/3) loamy sand; weak fine granular structure; very friable; many fine and medium roots; about 5 percent, by volume, sandstone channers; strongly acid; abrupt wavy boundary.

E—4 to 10 inches; yellowish brown (10YR 5/4) sandy loam; weak fine granular structure; friable; common fine and few medium roots; about 5 percent, by volume, sandstone channers; moderately acid; clear wavy boundary.

EB—10 to 16 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; about 10 percent, by volume, sandstone channers; strongly acid; clear wavy boundary.

Bt—16 to 31 inches; strong brown (7.5YR 5/8) sandy clay loam; moderate medium subangular blocky structure; friable; few thin distinct patchy clay films on faces of peds; about 10 percent, by volume, sandstone channers, increasing to 25 percent within the lower 4 inches; strongly acid; clear wavy boundary.

Cr—31 to 60 inches; strong brown and yellowish brown, level-bedded, weathered sandstone.

The thickness of the solum and the depth to soft bedrock range from 20 to 40 inches. Reaction ranges from very strongly acid to medium acid throughout the profile unless the surface layer has been limed. The content of sandstone and siltstone fragments ranges, by volume, from 0 to 15 percent.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. It is loamy sand or sandy loam.

The E and EB horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. They are loamy sand or sandy loam. Some pedons do not have an E or EB horizon.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 8. In some pedons the lower part of this horizon has mottles in shades of brown or yellow. This horizon is sandy loam, loam, sandy clay loam, or clay loam. In some pedons the content of coarse fragments in the lower part of this horizon ranges, by volume, from 15 to 35 percent.

The Cr horizon is weakly cemented to slightly weathered sandstone. It can be cut with a spade in most places.

Smithdale Series

The Smithdale series consists of deep, well drained, moderately permeable soils that formed in loamy sediments of the Coastal Plain. These soils are on ridgetops and the upper side slopes. Slopes range from 8 to 25 percent. The soils are fine-loamy, siliceous, thermic Typic Hapludults.

Smithdale soils are geographically associated with Sunlight and Townley soils. The associated soils are at a lower elevation than the Smithdale soils. Sunlight soils have a loamy-skeletal control section. Townley soils have a clayey argillic horizon.

Typical pedon of Smithdale sandy loam, 8 to 25 percent slopes, 1,400 feet east and 650 feet south of the northwest corner of sec. 29, T. 13 S., R. 10 W.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; abrupt wavy boundary.

A2—2 to 6 inches; dark brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

BE—6 to 18 inches; yellowish brown (10YR 5/6) sandy loam; weak fine granular structure; very friable; few fine and medium roots; strongly acid; clear wavy boundary.

Bt1—18 to 28 inches; red (2.5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; bridged and coated sand grains; thin clay flows along pores; very strongly acid; gradual wavy boundary.

Bt2—28 to 62 inches; red (2.5YR 5/8) sandy loam; weak medium subangular blocky structure; friable; bridged and coated sand grains; clay flows along pores; very strongly acid.

The solum is more than 60 inches thick. Reaction is very strongly acid or strongly acid throughout the profile unless the surface layer has been limed. The content of rounded quartz gravel ranges, by volume, from 0 to 10 percent throughout the solum.

The A horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 6. The E or BE horizon has hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 4 to 6. It is sandy loam or loamy sand. Some pedons do not have an E or BE horizon.

The Bt horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. It is sandy loam, loam, or sandy clay loam. In some pedons the lower part of this horizon has few to many pockets of uncoated sand grains.

Spadra Series

The Spadra series consists of deep, well drained, moderately permeable soils that formed in loamy alluvium derived mainly from sandstone, siltstone, and shale. These soils are on nearly level and gently sloping stream terraces. Slopes range from 0 to 3 percent. The soils are fine-loamy, siliceous, thermic Typic Hapludults.

Spadra soils are geographically associated with Allen, Mooreville, Pruitton, and Whitwell soils. Allen soils are in the higher positions on the landscape. They have an argillic horizon that is red and is thicker than that of the Spadra soils. Mooreville, Pruitton, and Whitwell soils are in the lower positions on the landscape. Mooreville and Pruitton soils do not have an argillic horizon. Whitwell soils are moderately well drained.

Typical pedon of Spadra fine sandy loam, in an area of Spadra-Whitwell complex, 0 to 3 percent slopes, occasionally flooded, 1,400 feet west and 400 feet north of the southeast corner of sec. 28, T. 14 S., R. 9 W.

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; medium acid; abrupt wavy boundary.

Bt1—7 to 21 inches; dark brown (7.5YR 4/4) loam; weak medium subangular blocky structure; very friable; common fine and medium roots; common fine pores; few thin patchy clay films on faces of peds and in pores; strongly acid; clear wavy boundary.

Bt2—21 to 33 inches; mottled dark yellowish brown (10YR 4/6), yellowish brown (10YR 5/4), and light yellowish brown (10YR 6/4) loam; weak medium subangular blocky structure; very friable; common fine roots; common fine pores; few thin patchy clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.

Bt3—33 to 53 inches; dark brown (7.5YR 4/4) loam; common medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; few thin patchy clay films on faces of peds and in pores; strongly acid; gradual smooth boundary.

BC—53 to 58 inches; dark brown (7.5YR 4/4) loam; weak coarse subangular blocky structure; friable; few fine roots; strongly acid; gradual smooth boundary.

C—58 to 64 inches; dark yellowish brown (10YR 4/6) sandy loam; massive; friable; medium acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction ranges from medium acid to very strongly acid throughout the profile unless the surface layer has been limed. Some pedons have 0 to 10 percent rounded coarse fragments.

The A horizon has hue of 7.5YR or 10YR and value and chroma of 3 or 4. It is fine sandy loam or loam.

The upper part of the Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The lower part has hue of 7.5YR or 10YR and value and chroma of 4 to 6. In some pedons it is mottled in shades of brown or yellow. This horizon is loam or sandy clay loam.

Most pedons have a BC horizon. This horizon has colors similar to those of the Bt horizon. In some pedons it is mottled. It is sandy loam or loam.

The C horizon has hue of 7.5YR to 10YR, value of 4

to 6, and chroma of 2 to 8, or it is mottled and has no matrix color. The texture is similar to that of the BC horizon. Some pedons do not have a C horizon.

Some pedons have a 2C horizon. These pedons are in areas where the alluvium is directly underlain by Pennsylvanian sediments of shale, siltstone, or sandstone.

Sunlight Series

The Sunlight series consists of shallow, well drained, moderately permeable soils that formed in material weathered from siltstone that has a few strata of sandstone. These soils are on moderately steep to very steep side slopes. Slopes range from 15 to 45 percent. The soils are loamy-skeletal, mixed, thermic, shallow Ochreptic Hapludults.

Sunlight soils are geographically associated with Montevallo, Nauvoo, Sipsey, Smithdale, and Townley soils. Montevallo soils do not have an argillic horizon. They are in landscape positions similar to those of the Sunlight soils. Nauvoo, Sipsey, Smithdale, and Townley soils have a solum that is more than 20 inches thick. They generally are on ridgetops. Nauvoo, Smithdale, and Sipsey soils have a fine-loamy argillic horizon, and Townley soils have a clayey argillic horizon.

Typical pedon of Sunlight channery loam, in an area of Sunlight-Townley complex, 15 to 45 percent slopes, 1,000 feet east and 150 feet south of the northwest corner of sec. 2, T. 15 S., R. 7 W.

A—0 to 3 inches; dark brown (10YR 3/3) channery silt loam; weak fine granular structure; friable; many fine and medium roots; about 15 percent channers of shaly siltstone; strongly acid; clear wavy boundary.

Bt1—3 to 5 inches; yellowish brown (10YR 5/6) channery silty clay loam; weak fine subangular blocky structure; friable; many fine and medium roots; thin patchy clay films on faces of some peds; about 30 percent shaly siltstone channers; strongly acid; clear wavy boundary.

Bt2—5 to 12 inches; strong brown (7.5YR 5/6) very channery silty clay loam; weak fine subangular blocky structure; friable; few medium roots; thin patchy clay films on faces of some peds and channers; about 60 percent siltstone and sandstone channers; very strongly acid; gradual wavy boundary.

Cr—12 to 60 inches; yellowish brown (10YR 5/8), weathered, fractured shaly siltstone and sandstone; less than 5 percent, by volume, Bt material in the cracks.

The thickness of the solum and depth to the Cr horizon range from 10 to 20 inches. Reaction is very strongly acid or strongly acid throughout the profile unless the surface layer has been limed.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 4. It is less than 5 inches thick. It is silt loam, sandy loam, loam, or the channery analogs of those textures. The content of coarse fragments ranges, by volume, from 10 to 25 percent.

Some pedons have a thin BE horizon. This horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 8. It is channery silt loam, channery sandy loam, or channery loam. The content of coarse fragments ranges, by volume, from 25 to 35 percent.

The Bt horizon has hue of 5YR to 10YR, value of 4 to 6, and chroma of 4 to 8. It is the channery, very channery, or extremely channery analogs of sandy loam, silt loam, silty clay loam, loam, or clay loam. The content of coarse fragments ranges, by volume, from 35 to 90 percent.

The Cr horizon is weakly consolidated or fractured shaly siltstone, siltstone, sandstone, or a combination of these. Pockets of soil material are in the cracks. This horizon generally can be ripped with hand tools and light equipment to a depth of more than 6 feet.

Townley Series

The Townley series consists of moderately deep, well drained, slowly permeable soils that formed in clayey material weathered from shale or interbedded shale, siltstone, and sandstone. These soils are on nearly level to very steep ridges, side slopes, and foot slopes. Slopes range from 2 to 45 percent. The soils are clayey, mixed, thermic Typic Hapludults.

Townley soils are geographically associated with Bankhead, Montevallo, Nauvoo, Sipsey, and Sunlight soils. Bankhead soils are on side slopes. They have a coarse-loamy control section. Montevallo and Sunlight soils are on side slopes at a lower elevation than that of the Townley soils. They have a loamy-skeletal control section. Nauvoo and Sipsey soils are in landscape positions similar to those of the Townley soils. They have a fine-loamy argillic horizon.

Typical pedon of Townley silt loam, in an area of Sunlight-Townley complex, 15 to 45 percent slopes, 1,100 feet east and 800 feet north of the southwest corner of sec. 18, T. 15 S., R. 7 W.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; very friable; many fine and few medium roots; about 10

percent sandstone pebbles; strongly acid; clear wavy boundary.

A2—3 to 7 inches; brown (7.5YR 5/4) gravelly loam; moderate medium granular structure; very friable; common fine and few medium roots; about 25 percent sandstone pebbles; strongly acid; clear wavy boundary.

Bt1—7 to 14 inches; strong brown (7.5YR 5/8) clay; moderate medium subangular blocky structure; friable; few medium roots; about 15 percent sandstone channers; patchy clay films on faces of most peds; strongly acid; gradual wavy boundary.

Bt2—14 to 27 inches; strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; friable; about 10 percent sandstone channers; patchy clay films on faces of most peds; very strongly acid; gradual wavy boundary.

BC—27 to 36 inches; mottled strong brown (7.5YR 5/6) and brownish yellow (10YR 6/6) clay; weak medium subangular blocky structure or massive; firm; few thin patchy clay films on faces of some peds; about 15 percent pockets of slightly weathered siltstone; very strongly acid; gradual wavy boundary.

Cr—36 to 60 inches; brown, red, and gray, level-bedded, weathered, interbedded siltstone and shale; very firm; very strongly acid.

The thickness of the solum ranges from 20 to 36 inches, and the depth to interbedded shale and siltstone bedrock ranges from 25 to 40 inches. The upper part of the solum has 5 to 20 percent fragments of fine grained sandstone and siltstone. The lower part has 10 to 30 percent fragments of siltstone and fine grained sandstone. Reaction ranges from extremely acid to strongly acid throughout the profile unless the surface layer has been limed.

The A1 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam or loam. The A2 horizon has hue of 7.5YR and value and chroma of 4 to 6. It is gravelly silt loam or loam. Some pedons do not have an A2 horizon.

The Bt horizon has hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8. It is silty clay loam, silty clay, or clay.

Most pedons have a BC horizon. This horizon is mottled in shades of brown, yellow, or red. It is silty clay loam, silty clay, or clay.

The Cr horizon is interbedded shale, sandstone, and siltstone that can be ripped with machinery.

Whitwell Series

The Whitwell series consists of deep, moderately well drained, moderately permeable soils that formed in alluvial material derived mainly from siltstone and sandstone. These soils are on nearly level and gently sloping stream terraces. Slopes range from 1 to 3 percent. The soils are fine-loamy, siliceous, thermic Aquic Hapludults.

Whitwell soils are geographically associated with Allen, Mooreville, Pruitton, and Spadra soils. Allen soils are on uplands and are well drained. Mooreville soils are in the lower positions on the landscape. They do not have an argillic horizon. Pruitton soils are well drained and do not have an argillic horizon. They are on flood plains. Spadra soils are well drained and are at the slightly higher elevations.

Typical pedon of Whitwell silt loam, in an area of Spadra-Whitwell complex, 0 to 3 percent slopes, occasionally flooded, 200 feet west and 10 feet south of the northeast corner of sec. 29, T. 14 S., R. 7 W.

Ap—0 to 8 inches; brown (10YR 5/3) silt loam; common medium faint dark brown (10YR 4/3) mottles; moderate medium granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

BE—8 to 16 inches; brown (10YR 5/3) silt loam; common medium distinct pale brown (10YR 6/3) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; common fine pores; strongly acid; clear wavy boundary.

Bt1—16 to 27 inches; light yellowish brown (10YR 5/4) loam; common medium distinct dark yellowish brown (10YR 4/4) and few fine distinct light gray (10YR 7/2) mottles; moderate medium subangular blocky structure; friable; common fine pores; thin patchy clay films on faces of some peds and in pores; strongly acid; clear wavy boundary.

Bt2—27 to 45 inches; brownish yellow (10YR 5/4) loam; common medium distinct light gray (10YR 7/1) and common fine distinct very pale brown (10YR 7/3) mottles; moderate medium subangular blocky structure; friable; common fine roots; common fine pores; thin patchy clay films on faces of some peds and in pores; few medium roots; about 2 percent, by volume, sandstone channers; strongly acid; gradual wavy boundary.

Bt3—45 to 52 inches; yellowish brown (10YR 5/6) loam; common medium distinct light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; sand grains coated and bridged with clay; strongly acid; clear wavy boundary.

C—52 to 64 inches; mottled yellowish brown (10YR 5/6), light gray (10YR 7/1), dark brown (10YR 4/3), and light yellowish brown (10YR 6/4), stratified loam

and sandy loam; massive; friable; about 3 percent, by volume, dark concretions; strongly acid.

The thickness of the solum ranges from 30 to 60 inches. Reaction is very strongly acid or strongly acid throughout the profile unless the surface layer has been limed. The content of sandstone channers ranges, by volume, from 0 to 10 percent throughout the profile.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is silt loam or loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. Mottles that have chroma of 2 or less are in the upper 20 inches of this horizon. In some pedons the lower part of the horizon is mottled in shades of brown, gray, or yellow. This horizon is silt loam, loam, silty clay loam, or clay loam.

The C horizon is mottled in shades of brown, gray, or yellow. It is silt loam, loam, silty clay loam, clay loam, or sandy loam. In some pedons this horizon is stratified.

Wynnville Series

The Wynnville series consists of deep, moderately well drained soils that formed in loamy material weathered from sandstone and shale. These soils have a fragipan. They are moderately permeable above the fragipan and moderately slowly permeable in and below the fragipan. They are on nearly level to moderately sloping terraces. Slopes range from 0 to 8 percent. The soils are fine-loamy, siliceous, thermic Glossic Fragiudults.

Wynnville soils are geographically associated with Nauvoo, Nectar, Sipsey, and Townley soils, which are on uplands. Nauvoo, Nectar, and Sipsey soils do not have a fragipan. Townley soils have a clayey argillic horizon.

Typical pedon of Wynnville fine sandy loam, 0 to 4 percent slopes, 2,500 feet east and 1,370 feet south of the northwest corner of sec. 14, T. 13 S., R. 8 W.

Ap—0 to 10 inches; brown (2.5Y 5/3) fine sandy loam; weak medium granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

Bw—10 to 22 inches; strong brown (7.5YR 5/6) loam; weak medium granular and subangular blocky structure; friable; common fine roots; few sandstone fragments; strongly acid; clear smooth boundary.

Btx/E—22 to 37 inches; yellowish brown (10YR 5/6) loam (Btx); common medium distinct strong brown (7.5YR 5/6) mottles; tongues and pockets of light gray (10YR 7/2) sandy loam (E); weak coarse platy structure parting to weak medium subangular blocky; firm; slightly brittle and compact in about 70 percent of the volume; few fine roots in the tongues; common fine pores; few thin patchy clay films on faces of some peds; few brown concretions; very strongly acid; clear irregular boundary.

Btx—37 to 56 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium distinct light brownish gray (10YR 6/2) and yellowish red (5YR 5/8) mottles; weak medium platy structure parting to weak medium subangular blocky; firm; slightly brittle and compact in about 70 percent of the volume; common fine pores; thin patchy clay films on faces of some peds; few brown concretions; very strongly acid; gradual irregular boundary.

Bt—56 to 64 inches; strong brown (7.5YR 5/6) sandy clay loam; common medium distinct yellowish red (5YR 5/8) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable and firm; thin patchy clay films on faces of some peds; few brown concretions; very strongly acid.

The thickness of the solum ranges from 40 to 72 inches. Depth to the fragipan ranges from 18 to 36 inches. Reaction is very strongly acid or strongly acid throughout the profile unless the surface layer has been limed. The content of sandstone fragments ranges, by volume, from 0 to 10 percent throughout the profile.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It is loam, fine sandy loam, or sandy loam.

Some pedons have a BE horizon. This horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 4 to 6. It is loam or sandy loam.

The Bw horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 to 8. In many pedons it is mottled in shades of red, brown, yellow, or gray. It is loam, sandy clay loam, or sandy loam.

The Btx part of the Btx/E horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 5 to 8. It is commonly mottled in shades of red, gray, or brown. It is sandy loam, sandy clay loam, or loam. The E part has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 1 to 3. It is sandy loam or loam.

The Btx horizon has hue of 5YR to 10YR, value of 4 or 5, and chroma of 6 to 8. It commonly has mottles in shades of red, gray, or brown. It is sandy clay loam, loam, or clay loam.

The Bt horizon has hue of 2.5YR, 5YR, or 7.5YR, value of 5, and chroma of 6 to 8. It is mottled in shades of brown, gray, or red. It is loam, sandy clay loam, or clay loam.

Formation of the Soils

This section describes the processes of soil formation and relates the soils in Walker County to the factors of soil formation.

Processes of Soil Formation

The processes involved in the formation of soil horizons are the accumulation of organic matter, the leaching of calcium carbonate and bases, the reduction and transfer of iron, and the formation and translocation of silicate clay minerals. These processes can occur in combination or individually, depending on the integration of the factors of soil formation.

The A, E, B, and C horizons are the four main horizons in most soils. The A horizon is the surface layer. It has the maximum accumulation of organic matter. The E horizon, or the subsurface layer, is characterized by the maximum loss of soluble or suspended material. Sipsey soils have A and E horizons. Other soils, such as Pruitton soils, have an A horizon but do not have an E horizon. Organic matter has accumulated in the surface layer of all the soils in Walker County. The content of organic matter varies in different soils because of variations in relief, wetness, and inherent fertility.

The B horizon, or the subsoil, is directly below the A or E horizon. It has the maximum accumulation of dissolved or suspended material, such as iron and clay. A B horizon has not formed in very young soils, such as Brilliant and Palmerdale soils.

The C horizon, or the substratum, has been affected very little by soil-forming processes but can be somewhat modified by weathering.

Gleying is the chemical reduction and transfer of iron. It is evidenced in the wet soils of the county by a gray subsoil and gray mottles in other horizons.

Carbonates and bases have been leached in most of the soils of the county. This process contributes to horizon development and to the inherent low fertility and acid reaction of the soils.

Factors of Soil Formation

Soil is a natural, three-dimensional body on the earth's surface. It supports plants and has properties resulting from the interaction of parent material, climate, relief, and flora and fauna over time. These factors determine the nature of the soil that forms at any point on the earth. The relative importance of each factor differs from place to place. Sometimes one factor is more important and sometimes another. When a factor varies, a different soil forms.

Climate and living organisms are the active factors of soil formation. They act on the parent material and change it into a natural body with definite characteristics. Relief conditions the effects of climate and living organisms. It also affects surface drainage, the amount of water that percolates through the soil, the rate of erosion, and the kind of vegetation that grows on the soil. The nature of the parent material affects the kind of soil profile that forms. Time is needed for the transformation of the parent material into a soil. Normally, the development of a distinct soil horizon requires a long period of time.

Parent Material

The soils in Walker County formed mainly in marine sediments that have undergone considerable weathering in place, water-deposited material on flood plains and stream terraces, and material weathered from bedrock. Smithdale soils are examples of soils that formed in weathered marine sediments. Mooreville, Pruitton, Spadra, and Whitwell are examples of soils that formed in the water-deposited material on stream terraces and flood plains. Most of the other soils in the county, including Bankhead, Montevallo, Sipsey, Sunlight, and Townley soils, formed in material weathered from the underlying bedrock.

Climate

The climate of Walker County is warm and humid. Summers are long and hot. Winters are short and mild, and the ground rarely freezes to a depth of more than a few inches. The climate is fairly even throughout the county and accounts for few differences among the soils. The annual rainfall averages 58.3 inches. This mild, humid climate favors the rapid decomposition of organic matter and hastens chemical reactions in the soil. The plentiful rainfall leaches large amounts of

soluble bases and carries the less soluble fine particles downward, resulting in acid, sandy soils that are low in natural fertility. The large amount of moisture and the warm temperature favor the growth of bacteria and fungi and speed the decomposition of organic matter, resulting in soils that are low in content of organic matter.

Relief

Relief influences soil formation through its effect on drainage, runoff, and erosion. The soils in Walker County range from nearly level to steep. Elevation ranges from 300 to 700 feet above sea level. As the slope increases, the hazard of erosion and the runoff rate increase, less water soaks into the soil, and the extent of leaching decreases. In places erosion nearly keeps pace with soil formation; therefore, steep soils are generally shallow and weakly developed.

Natural drainage generally is closely associated with slope or relief. Drainage, in turn, affects the color of the soil. Allen and other well drained soils have a uniformly bright color in the subsoil. The moderately well drained Mooreville, Whitwell, and Wynnville soils have a subsoil that is mottled in shades of gray and brown. The grayish color persists even after a drainage system is installed.

The direction in which a slope faces affects the microclimate. Soils on slopes facing south or southwest warm up somewhat earlier in spring and generally reach a higher temperature each day than soils on slopes facing north. As a result, chemical weathering is accelerated. The soils on north-facing slopes retain moisture longer because they are shaded for longer periods and have a lower temperature. In Walker County the differences caused by the direction in which a slope faces are slight.

Flora and Fauna

Plant and animal life greatly influences the formation and character of the soil. The other factors of soil formation generally determine the trees, grasses, earthworms, rodents, fungi, bacteria, and other forms of plant and animal life in and on the soil. Animal activity is confined mainly to the surface layer. It continually mixes the soil and increases the rate of water infiltration. Plant roots create channels through which air and water move more rapidly, thus improving soil structure and increasing the rate of chemical reactions.

Time

If all the other factors of soil formation are equal, the degree of soil formation is in direct proportion to time. If the soil-forming factors have been active for a long time, horizon development is stronger than if these factors have been active for a relatively short time.

Geologically, most of the soils in Walker County are fairly young. The youngest soils are the alluvial soils along streams. These soils receive sediments during periods of flooding. In most areas they have very weakly defined horizons, mainly because the soil-forming processes have been active for a short time.

The soils on terraces along the Black Warrior River are younger than the soils on flood plains. They formed in material deposited by the river, but the river channels are now deeper and their overflow seldom reaches these soils. Many of the soils are characterized by fairly strong horizon development.

The oldest soils in the county are those on uplands. They formed in material weathered from bedrock that has undergone considerable weathering.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a fragment.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly

below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic, or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral 2 precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Mean annual increment. Mean annual growth derived by dividing the total tree volume of any point in time by the total age.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a

soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace;

land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1960-81 at Jasper, Alabama)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January-----	50.5	27.6	39.1	73	0	36	5.66	3.06	7.94	8	1.0
February----	55.8	30.0	42.9	79	10	38	5.00	2.46	7.20	7	.3
March-------	66.0	37.5	51.8	86	18	152	7.23	4.18	9.93	9	.2
April-------	76.0	46.4	61.2	89	28	340	5.67	2.85	8.11	6	.0
May---------	80.5	53.9	67.2	92	35	533	4.95	2.72	6.91	7	.0
June--------	87.0	62.2	74.6	98	46	738	3.93	1.79	5.76	6	.0
July--------	89.8	66.4	78.1	100	54	871	5.28	2.97	7.33	8	.0
August------	89.3	65.5	77.4	98	55	849	3.80	1.81	5.51	6	.0
September---	84.2	59.7	72.0	96	41	660	3.93	1.78	5.76	6	.0
October-----	73.9	45.5	59.7	88	26	308	3.14	1.19	4.80	5	.0
November----	63.3	36.7	50.0	80	16	99	3.72	1.94	5.27	7	.0
December----	54.2	30.5	42.4	74	8	32	5.99	2.97	8.61	8	.2
Yearly:											
Average---	72.5	46.8	59.7	---	---	---	---	---	---	---	---
Extreme---	---	---	---	101	0	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,656	58.30	49.34	67.27	83	1.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1960-81 at Jasper, Alabama)

Probability	Temperature: 24 °F or lower	Temperature: 28 °F or lower	Temperature: 32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 6	Apr. 23	May 8
2 years in 10 later than--	Mar. 27	Apr. 13	Apr. 27
5 years in 10 later than--	Mar. 10	Mar. 25	Apr. 6
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 18	Oct. 9	Sept. 25
2 years in 10 earlier than--	Oct. 28	Oct. 20	Oct. 7
5 years in 10 earlier than--	Nov. 17	Nov. 9	Oct. 30

TABLE 3.--GROWING SEASON

(Recorded in the period 1960-81 at Jasper, Alabama)

Probability	Daily minimum temperature during growing season: Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	220	202	179
8 years in 10	229	208	186
5 years in 10	245	221	198
2 years in 10	263	234	211
1 year in 10	273	242	218

TABLE 4.--SUITABILITY AND LIMITATIONS OF GENERAL SOIL MAP UNITS FOR MAJOR LAND USES

Map unit	Extent of area	Cultivated crops	Pasture and hayland	Woodland	Urban uses	Intensive recreation areas	Extensive recreation areas
	Pct						
1. Sunlight-Townley-Sipsey	65	Poor: slope, depth to rock.	Fair or poor: slope, depth to rock.	Good to poor: slope.	Poor: depth to rock, percs slowly, slope.	Poor: slope, small stones.	Good.
2. Wynnville-Sipsey-Townley	3	Good	Good	Good	Poor: percs slowly, wetness, low strength.	Fair: wetness.	Good.
3. Spadra-Whitwell-Mooreville	4	Good	Good	Good	Poor: flooding, wetness.	Fair: flooding, wetness.	Good.
4. Townley-Sunlight	2	Fair or poor: slope, depth to rock.	Good or fair: slope, depth to rock.	Good	Poor: percs slowly, depth to rock, low strength, slope.	Poor: percs slowly.	Good.
5. Sipsey-Nauvoo	10	Fair or poor: slope.	Fair: slope.	Good	Poor: depth to rock, slope.	Fair: slope.	Good.
6. Smithdale-Townley	1	Poor: slope.	Poor or fair: slope.	Good	Poor: percs slowly, depth to rock, low strength, slope.	Poor: slope, small stones.	Good.
7. Sipsey-Bankhead	15	Poor: slope.	Poor: slope.	Fair or poor: slope.	Poor: depth to rock, slope.	Poor: slope, small stones.	Good.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AnC	Allen loam, 4 to 10 percent slopes	616	0.1
BaE	Bankhead-Rock outcrop complex, 15 to 60 percent slopes	8,112	1.6
BcE	Brilliant extremely channery loam, 6 to 40 percent slopes	5,219	1.0
BPE	Brilliant and Palmerdale extremely channery loams, 6 to 60 percent slopes	35,624	6.9
McE	Montevallo channery silt loam, 30 to 60 percent slopes	53,059	10.3
MoA	Mooreville silt loam, 0 to 1 percent slopes, frequently flooded	2,165	0.4
MsA	Mooreville frequently flooded-Spadra occasionally flooded complex, 0 to 3 percent slopes	7,222	1.4
NaE	Nauvoo-Townley complex, 4 to 20 percent slopes	21,161	4.1
NcC	Nauvoo-Sipsey-Urban land complex, 2 to 12 percent slopes	2,422	0.5
NnB	Nauvoo and Nectar fine sandy loams, 2 to 6 percent slopes	3,686	0.7
NSC	Nauvoo and Sipsey soils, 6 to 12 percent slopes	29,646	5.8
PrA	Pruitton loam, 0 to 2 percent slopes, frequently flooded	602	0.1
SeE	Sipsey loamy sand, 4 to 18 percent slopes	57,010	11.1
ShE	Sipsey-Bankhead complex, 15 to 45 percent slopes	54,022	10.5
SmE	Smithdale sandy loam, 8 to 25 percent slopes	2,221	0.4
SpB	Spadra-Whitwell complex, 0 to 3 percent slopes, occasionally flooded	17,158	3.3
SsE	Sunlight-Sipsey complex, 15 to 40 percent slopes	41,815	8.1
StE	Sunlight-Townley complex, 15 to 45 percent slopes	101,622	19.8
SuE	Sunlight-Townley-Urban land complex, 15 to 45 percent slopes	1,412	0.3
ToB	Townley silt loam, 2 to 6 percent slopes	3,664	0.7
ToD	Townley silt loam, 6 to 15 percent slopes	39,427	7.7
TuC	Townley-Urban land complex, 2 to 15 percent slopes	4,703	0.9
WyB	Wynnville fine sandy loam, 0 to 4 percent slopes	11,153	2.2
WyC	Wynnville fine sandy loam, 4 to 8 percent slopes	2,862	0.6
	Water	7,682	1.5
	Total	514,285	100.0

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Grain sorghum	Soybeans	Wheat	Sericea lespedeza	Improved bermudagrass	Tall fescue and white clover
		Bu	Bu	Bu	Bu	AUM*	Tons	AUM*
AnC------------- Allen	IIIe	80	85	32	52	7.0	5.0	7.0
BaE------------- Bankhead-Rock outcrop	VIIe	---	---	---	---	---	---	---
BcE------------- Brilliant	VIIs	---	---	---	---	5.0	---	4.5
BPE------------- Brilliant and Palmerdale	VIIs	---	---	---	---	4.0	---	3.5
McE------------- Montevallo	VIIe	---	---	---	---	---	---	---
MoA------------- Mooreville	Vw	---	---	---	---	---	---	8.0
MsA-------------		95	100	35	50	8.0	6.0	8.5
Mooreville-----	Vw							
Spadra---------	IIw							
NaE------------- Nauvoo-Townley	VIe	---	---	---	---	6.5	4.5	6.5
NcC. Nauvoo-Sipsey-Urban land								
NnB------------- Nauvoo and Nectar	IIe	75	85	30	50	7.0	5.0	7.0
NSC------------- Nauvoo and Sipsey	IVe	65	80	25	45	6.5	4.5	6.5
PrA------------- Pruitton	IIIw	80	60	30	45	7.5	6.0	8.5
SeE------------- Sipsey	IVe	---	---	---	---	6.5	4.0	6.5
ShE------------- Sipsey-Bankhead	VIIe	---	---	---	---	3.0	3.0	4.0
SmE------------- Smithdale	VIIe	---	---	---	---	4.0	4.0	5.0
SpB------------- Spadra-Whitwell	IIw	95	100	35	50	8.0	6.0	9.0
SsE------------- Sunlight-Sipsey	VIIe	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Grain sorghum	Soybeans	Wheat	Sericea lespedeza	Improved bermudagrass	Tall fescue and white clover
		Bu	Bu	Bu	Bu	AUM*	Tons	AUM*
StE------------- Sunlight- Townley	VIIe	---	---	---	---	3.0	3.0	4.0
SuE. Sunlight- Townley-Urban land								
ToB------------- Townley	IIIe	60	75	30	40	7.0	5.0	7.0
ToD------------- Townley	VIe	---	---	---	---	6.0	4.5	6.0
TuC. Townley-Urban land								
WyB------------- Wynnville	IIe	95	100	35	40	8.0	5.0	9.0
WyC------------- Wynnville	IIIe	85	95	30	40	7.5	5.0	8.5

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
AnC----------------- Allen	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine-------	80	110	Loblolly pine, yellow poplar, shortleaf pine.
							Yellow poplar-------	90	---	
							Shortleaf pine------	70	---	
BaE:										
Bankhead----------	8R	Severe	Severe	Moderate	Moderate	Moderate	Loblolly pine-------	80	110	Loblolly pine, longleaf pine.
							Virginia pine-------	70	---	
							Longleaf pine-------	70	---	
Rock outcrop.										
BcE----------------- Brilliant	8R	Severe	Severe	Severe	Slight	Slight	Loblolly pine-------	85	120	Loblolly pine, American sycamore, eastern cottonwood, eastern redcedar.
							American sycamore---	90	---	
							Virginia pine-------	75	---	
							Sweetgum------------	85	---	
							Eastern cottonwood--	90	---	
BPE:										
Brilliant---------	8R	Severe	Severe	Severe	Slight	Slight	Loblolly pine-------	85	120	Loblolly pine, American sycamore, eastern cottonwood, eastern redcedar.
							American sycamore---	90	---	
							Virginia pine-------	75	---	
							Sweetgum------------	85	---	
							Eastern cottonwood--	90	---	
Palmerdale--------	8R	Severe	Severe	Severe	Slight	Slight	Loblolly pine-------	85	120	Loblolly pine, American sycamore, eastern cottonwood.
							Sweetgum------------	85	---	
							Virginia pine-------	75	---	
							American sycamore---	90	---	
							Eastern cottonwood--	90	---	
McE----------------- Montevallo	6R	Severe	Severe	Severe	Moderate	Slight	Loblolly pine-------	70	93	Loblolly pine.
							Shortleaf pine------	60	---	
							Virginia pine-------	60	---	
MoA----------------- Mooreville	11W	Slight	Severe	Severe	Slight	Severe	Loblolly pine-------	100	154	Loblolly pine, water oak, sweetgum, yellow poplar.
							Water oak-----------	100	---	
							Sweetgum------------	100	---	
							Yellow poplar-------	110	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
MsA:										
Mooreville	11W	Slight	Severe	Severe	Slight	Severe	Loblolly pine	100	154	Loblolly pine, water oak, sweetgum, yellow poplar.
							Water oak	100	---	
							Sweetgum	100	---	
							Yellow poplar	110	---	
Spadra	10A	Slight	Slight	Slight	Slight	Severe	Loblolly pine	95	142	Loblolly pine, water oak, yellow poplar.
							Water oak	90	---	
							Yellow poplar	110	---	
NaE:										
Nauvoo	9A	Moderate	Moderate	Slight	Slight	Moderate	Loblolly pine	85	120	Loblolly pine, yellow poplar, sweetgum.
							Shortleaf pine	75	---	
							Virginia pine	75	---	
							Yellow poplar	95	---	
							Sweetgum	85	---	
Townley	8R	Moderate	Moderate	Slight	Moderate	Moderate	Loblolly pine	80	110	Loblolly pine.
							Virginia pine	70	---	
							Shortleaf pine	70	---	
NnB:										
Nauvoo	9A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine	85	120	Loblolly pine, yellow poplar, sweetgum.
							Shortleaf pine	75	---	
							Virginia pine	75	---	
							Yellow poplar	95	---	
							Sweetgum	85	---	
Nectar	9A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine	85	120	Loblolly pine, yellow poplar, sweetgum.
							Shortleaf pine	75	---	
							Virginia pine	75	---	
							Yellow poplar	95	---	
							Sweetgum	85	---	
NSC:										
Nauvoo	9A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine	85	120	Loblolly pine, yellow poplar, sweetgum.
							Shortleaf pine	75	---	
							Virginia pine	75	---	
							Yellow poplar	95	---	
							Sweetgum	85	---	
Sipsey	8A	Moderate	Slight	Slight	Slight	Moderate	Loblolly pine	80	110	Loblolly pine.
							Virginia pine	70	---	
							White oak	---	---	
							Blackjack oak	---	---	
							Shortleaf pine	70	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Volume*	Trees to plant
PrA----------------- Pruitton	9A	Slight	Slight	Slight	Slight	Severe	Loblolly pine--------	90	131	Loblolly pine, yellow poplar, black walnut.
							Yellow poplar--------	100	---	
							White oak------------	80	---	
							Shortleaf pine-------	80	---	
SeE----------------- Sipsey	8A	Moderate	Slight	Slight	Slight	Moderate	Loblolly pine--------	80	110	Loblolly pine.
							Virginia pine--------	70	---	
							Shortleaf pine-------	70	---	
ShE:										
Sipsey-------------	8R	Severe	Severe	Moderate	Moderate	Moderate	Loblolly pine--------	80	110	Loblolly pine, longleaf pine.
							Virginia pine--------	70	---	
							Longleaf pine--------	70	---	
							Shortleaf pine-------	70	---	
Bankhead-----------	8R	Severe	Severe	Moderate	Moderate	Moderate	Loblolly pine--------	80	110	Loblolly pine, longleaf pine.
							Virginia pine--------	70	---	
							Longleaf pine--------	70	---	
SmE----------------- Smithdale	8R	Moderate	Moderate	Slight	Slight	Slight	Loblolly pine--------	80	110	Loblolly pine.
							Shortleaf pine-------	70	---	
SpB:										
Spadra-------------	10A	Slight	Slight	Slight	Slight	Severe	Loblolly pine--------	95	142	Loblolly pine, yellow poplar.
							Water oak------------	90	---	
							Yellow poplar--------	100	---	
Whitwell-----------	9W	Slight	Moderate	Moderate	Slight	Severe	Loblolly pine--------	90	131	Loblolly pine, yellow poplar, sweetgum.
							Yellow poplar--------	100	---	
							Sweetgum-------------	90	---	
SsE:										
Sunlight-----------	6D	Severe	Severe	Moderate	Severe	Slight	Loblolly pine--------	70	93	Loblolly pine.
							Virginia pine--------	60	---	
							Shortleaf pine-------	60	---	
Sipsey-------------	8R	Severe	Severe	Moderate	Moderate	Moderate	Loblolly pine--------	80	110	Loblolly pine, longleaf pine.
							Virginia pine--------	70	---	
							Shortleaf pine-------	70	---	
							Longleaf pine--------	70	---	
StE:										
Sunlight-----------	6D	Severe	Severe	Moderate	Severe	Slight	Loblolly pine--------	70	93	Loblolly pine.
							Virginia pine--------	60	---	
							Shortleaf pine-------	60	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Volume*	Trees to plant
StE:										
Townley-----------	8R	Severe	Severe	Slight	Moderate	Moderate	Loblolly pine-------	80	110	Loblolly pine.
							Virginia pine-------	70	---	
							Shortleaf pine------	70	---	
ToB---------------- Townley	8C	Slight	Moderate	Slight	Moderate	Moderate	Loblolly pine-------	80	110	Loblolly pine.
							Virginia pine-------	70	---	
							Shortleaf pine------	70	---	
ToD---------------- Townley	8R	Moderate	Moderate	Slight	Moderate	Moderate	Loblolly pine-------	80	110	Loblolly pine.
							Virginia pine-------	70	---	
							Shortleaf pine------	70	---	
WyB, WyC----------- Wynnville	8A	Slight	Slight	Slight	Slight	Moderate	Loblolly pine-------	85	120	Loblolly pine, yellow poplar.
							Shortleaf pine------	80	---	
							Yellow poplar-------	90	---	
							Sweetgum------------	85	---	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AnC: Allen	Slight	Slight	Severe: slope.	Slight	Slight.
BaE: Bankhead	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
BcE: Brilliant	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, slope.
BPE: Brilliant	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Palmerdale	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
McE: Montevallo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: droughty, slope, depth to rock.
MoA: Mooreville	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
MsA: Mooreville	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
Spadra	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
NaE: Nauvoo	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Townley	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope, small stones.	Slight	Moderate: depth to rock, slope.
NcC: Nauvoo	Slight	Slight	Severe: slope.	Slight	Slight.
Sipsey	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
NcC:					
Urban land.					
NnB:					
Nauvoo	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Nectar	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
NSC:					
Nauvoo	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Sipsey	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
PrA Pruitton	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Severe: erodes easily.	Severe: flooding.
SeE Sipsey	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
ShE:					
Sipsey	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Bankhead	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SmE Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
SpB:					
Spadra	Severe: flooding.	Slight	Moderate: small stones, flooding.	Slight	Moderate: flooding.
Whitwell	Severe: flooding.	Moderate: wetness.	Moderate: slope, small stones, wetness.	Slight	Moderate: flooding.
SsE:					
Sunlight	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Sipsey	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
StE:					
Sunlight	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Townley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
SuE:					
Sunlight	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Townley	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Urban land.					
ToB: Townley	Moderate: percs slowly.	Moderate: slope, percs slowly.	Severe: small stones.	Slight	Moderate: depth to rock.
ToD: Townley	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope, small stones.	Slight	Moderate: depth to rock, slope.
TuC:					
Townley	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope, small stones.	Slight	Moderate: depth to rock, slope.
Urban land.					
WyB: Wynnville	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, small stones, percs slowly.	Moderate: wetness.	Moderate: wetness.
WyC: Wynnville	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AnC: Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
BaE:										
Bankhead	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop.										
BcE: Brilliant	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
BPE:										
Brilliant	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Palmerdale	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
McE: Montevallo	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
MoA: Mooreville	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
MsA:										
Mooreville	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
Spadra	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
NaE:										
Nauvoo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Townley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NcC:										
Nauvoo.										
Sipsey.										
Urban land.										
NnB:										
Nauvoo	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Nectar	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
NSC:										
Nauvoo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
NSC:										
Sipsey	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
PrA: Pruitton	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
SeE: Sipsey	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ShE:										
Sipsey	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Bankhead	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
SmE: Smithdale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SpB:										
Spadra	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Whitwell	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
SsE:										
Sunlight	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Sipsey	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
StE:										
Sunlight	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Townley	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SuE:										
Sunlight.										
Townley.										
Urban land.										
ToB, ToD: Townley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
TuC:										
Townley.										
Urban land.										
WyB: Wynnville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
WyC: Wynnville	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AnC: Allen	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
BaE:						
Bankhead	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
BcE: Brilliant	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: small stones, slope.
BPE:						
Brilliant	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: small stones, slope.
Palmerdale	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: small stones, droughty, slope.
McE: Montevallo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope, depth to rock.
MoA: Mooreville	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
MsA:						
Mooreville	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Spadra	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
NaE:						
Nauvoo	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Townley	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: depth to rock, slope.
NcC:						
Nauvoo	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
NcC:						
Sipsey	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, slope.
Urban land.						
NnB:						
Nauvoo	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Nectar	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
NSC:						
Nauvoo	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Sipsey	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, droughty, slope.
PrA: Pruitton	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
SeE: Sipsey	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, droughty, slope.
ShE:						
Sipsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Bankhead	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
SmE: Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SpB:						
Spadra	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Whitwell	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
SsE:						
Sunlight	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
Sipsey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
StE:						
Sunlight	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
Townley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
SuE:						
Sunlight	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
Townley	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Urban land.						
ToB Townley	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: depth to rock.
ToD Townley	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: depth to rock, slope.
TuC:						
Townley	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: depth to rock, slope.
Urban land.						
WyB Wynnville	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
WyC Wynnville	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Moderate: wetness.	Moderate: wetness.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AnC------------------ Allen	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight------------	Fair: too clayey.
BaE:					
Bankhead------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Rock outcrop.					
BcE------------------ Brilliant	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope, seepage.
BPE:					
Brilliant-----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope, seepage.
Palmerdale----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
McE------------------ Montevallo	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
MoA------------------ Mooreville	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
MsA:					
Mooreville----------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
Spadra--------------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
NaE:					
Nauvoo--------------	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: area reclaim, thin layer, slope.
Townley-------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
NcC:					
Nauvoo	Moderate: depth to rock, percs slowly.	Severe: slope.	Severe: depth to rock.	Slight	Fair: area reclaim, thin layer.
Sipsey	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Urban land.					
NnB:					
Nauvoo	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Slight	Fair: area reclaim, thin layer.
Nectar	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: depth to rock, too clayey.
NSC:					
Nauvoo	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: area reclaim, thin layer, slope.
Sipsey	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
PrA: Pruitton	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Good.
SeE: Sipsey	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
ShE:					
Sipsey	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Bankhead	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
SmE: Smithdale	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
SpB:					
Spadra	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SpB:					
Whitwell-----------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
SsE:					
Sunlight-----------	Severe: slope, depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Sipsey-------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
StE:					
Sunlight-----------	Severe: slope, depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Townley------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
SuE:					
Sunlight-----------	Severe: slope, depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Townley------------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Urban land.					
ToB----------------- Townley	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
ToD----------------- Townley	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
TuC:					
Townley------------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Urban land.					
WyB, WyC------------ Wynnville	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness.	Moderate: depth to rock, wetness.	Fair: area reclaim, wetness.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AnC: Allen	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
BaE:				
Bankhead	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop.				
BcE: Brilliant	Fair: large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
BPE:				
Brilliant	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Palmerdale	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
McE: Montevallo	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, depth to rock, slope.
MoA: Mooreville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
MsA:				
Mooreville	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Spadra	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
NaE:				
Nauvoo	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
Townley	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
NcC:				
Nauvoo	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
Sipsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Urban land.				
NnB:				
Nauvoo	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
Nectar	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
NSC:				
Nauvoo	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
Sipsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
PrA: Pruitton	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
SeE: Sipsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
ShE:				
Sipsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Bankhead	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
SmE: Smithdale	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
SpB:				
Spadra	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
Whitwell	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
SsE:				
Sunlight	Poor: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
SsE:				
Sipsey	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
StE:				
Sunlight	Poor: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Townley	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
SuE:				
Sunlight	Poor: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Townley	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
Urban land.				
ToB, ToD: Townley	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
TuC:				
Townley	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
Urban land.				
WyB, WyC: Wynnville	Fair: area reclaim, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AnC: Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
BaE: Bankhead	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rock outcrop.						
BcE: Brilliant	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
BPE: Brilliant	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Palmerdale	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
McE: Montevallo	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
MoA: Mooreville	Moderate: seepage.	Severe: wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
MsA: Mooreville	Moderate: seepage.	Severe: wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
Spadra	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Favorable	Favorable.
NaE: Nauvoo	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
Townley	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
NcC: Nauvoo	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
NcC:						
Sipsey	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
Urban land.						
NnB:						
Nauvoo	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
Nectar	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope	Favorable	Favorable.
NSC:						
Nauvoo	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
Sipsey	Severe: slope.	Severe: piping.	Deep to water	Fast intake, slope, droughty.	Slope, depth to rock.	Slope, droughty, depth to rock.
PrA Pruitton	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
SeE Sipsey	Severe: slope.	Severe: piping.	Deep to water	Fast intake, slope, droughty.	Slope, depth to rock.	Slope, droughty, depth to rock.
ShE:						
Sipsey	Severe: slope.	Severe: piping.	Deep to water	Fast intake, slope, droughty.	Slope, depth to rock.	Slope, droughty, depth to rock.
Bankhead	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
SmE Smithdale	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
SpB:						
Spadra	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
Whitwell	Moderate: seepage.	Severe: piping.	Flooding	Wetness, flooding.	Wetness	Favorable.
SsE:						
Sunlight	Severe: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
SsE: Sipsey	Severe: slope.	Severe: piping.	Deep to water	Fast intake, slope, droughty.	Slope, depth to rock.	Slope, droughty, depth to rock.
StE: Sunlight	Severe: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Townley	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
SuE: Sunlight	Severe: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Townley	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Urban land.						
ToB: Townley	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
ToD: Townley	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
TuC: Townley	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, percs slowly.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Urban land.						
WyB: Wynnville	Moderate: seepage, depth to rock.	Severe: piping.	Percs slowly	Percs slowly, rooting depth.	Rooting depth, percs slowly.	Rooting depth, percs slowly.
WyC: Wynnville	Moderate: seepage, depth to rock, slope.	Severe: piping.	Percs slowly, slope.	Percs slowly, rooting depth, slope.	Rooting depth, percs slowly.	Rooting depth, percs slowly.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
AnC: Allen	0-6	Loam	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-10
	6-41	Clay loam, sandy clay loam, loam.	CL-ML, CL, SC	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	40-80	20-43	4-19
	41-64	Clay loam, sandy clay loam, clay.	CL-ML, CL, SC, SM-SC	A-4, A-6, A-7-6	0-10	85-100	70-98	60-95	45-80	21-48	5-22
BaE:											
Bankhead	0-4	Sandy loam	SM	A-2, A-4	0-5	80-95	75-90	70-85	25-40	<20	NP
	4-26	Sandy loam, channery sandy loam, cobbly sandy loam.	SM, GM	A-2, A-4	0-35	60-95	55-90	50-85	25-45	<20	NP-3
	26-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
BcE: Brilliant	0-7	Extremely channery loam.	SM, SC, SP-SM, SM-SC	A-2-4, A-2-6, A-1	15-30	40-90	15-75	10-40	9-30	<30	NP-16
	7-84	Extremely channery sandy loam, extremely channery loam, extremely channery silt loam.	SM, SC, SM-SC, SP-SM	A-2-4, A-2-6, A-1	15-30	40-90	15-75	10-40	9-30	<30	NP-16
BPE:											
Brilliant	0-5	Extremely channery loam.	SM, SC, SP-SM, SM-SC	A-2-4, A-2-6, A-1	15-30	40-90	15-75	10-40	9-30	<30	NP-16
	5-60	Extremely channery sandy loam, extremely channery loam, extremely channery silt loam.	SM, SC, SM-SC, SP-SM	A-2-4, A-2-6, A-1	15-30	40-90	15-75	10-40	9-30	<30	NP-16
Palmerdale	0-6	Extremely channery loam.	GC, SM, GM, SC	A-1, A-2, A-3, A-4	15-30	40-85	15-75	10-60	9-40	<30	NP-10
	6-60	Extremely channery silt loam, very channery loam, extremely channery loam.	GC, SM, GM, SC	A-2, A-4, A-6, A-1	15-30	40-85	15-75	10-60	9-40	25-40	3-16
McE: Montevallo	0-3	Very channery loam.	SM-SC, SC, CL-ML, CL	A-4	0-5	60-88	50-75	45-70	40-65	<30	NP-10
	3-12	Very channery silt loam, extremely channery loam.	GM-GC, GC, SM-SC, SC	A-2, A-4, A-6, A-1-b	0-5	35-70	23-50	15-45	15-40	20-40	2-15
	12-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MoA-------------- Mooreville	0-8	Silt loam--------	CL-ML, CL, SM-SC, SC	A-4	0	100	100	80-100	40-85	20-30	5-10
	8-45	Sandy clay loam, clay loam, loam.	CL, SC	A-6, A-7	0	100	100	80-95	45-80	28-50	15-30
	45-60	Loam, sandy clay loam, clay loam.	SC, CL	A-6, A-7	0	100	100	80-95	45-80	28-50	15-30
MsA:											
Mooreville-------	0-6	Silt loam--------	CL-ML, CL, SM-SC, SC	A-4	0	100	100	80-100	40-85	20-30	5-10
	6-40	Sandy clay loam, clay loam, loam.	CL, SC	A-6, A-7	0	100	100	80-95	45-80	28-50	15-30
	40-62	Loam, sandy clay loam, clay loam.	SC, CL	A-6, A-7	0	100	100	80-95	45-80	28-50	15-30
Spadra-----------	0-7	Fine sandy loam	SM, SM-SC	A-4	0	85-100	85-100	60-85	35-50	<25	NP-7
	7-55	Loam, sandy clay loam, clay loam.	CL, SC	A-4, A-6	0	90-100	90-100	80-95	40-95	25-40	8-15
	55-62	Fine sandy loam, sandy loam, gravelly fine sandy loam.	CL, SM-SC, SC, CL-ML	A-4, A-2, A-1	0	60-100	50-100	40-95	20-75	<30	4-10
NaE:											
Nauvoo-----------	0-4	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4, A-2	0-3	90-100	85-100	55-93	30-60	<30	NP-8
	4-33	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	33-40	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	40-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Townley----------	0-5	Silt loam--------	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	5-31	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-37
	31-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
NcC:											
Nauvoo-----------	0-5	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4, A-2	0-3	90-100	85-100	55-93	30-60	<30	NP-8
	5-32	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	32-45	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sipsey-----------	0-12	Sandy loam-------	SM, SM-SC	A-2, A-4	0-10	85-100	85-100	70-95	26-45	<30	NP-7
	12-31	Sandy loam, loam, sandy clay loam.	SM-SC, SC, CL-ML, CL	A-4, A-6	0-15	85-100	65-100	60-95	35-60	<35	NP-15
	31-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Urban land.											

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
NnB:											
Nauvoo	0-4	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4, A-2	0-3	90-100	85-100	55-93	30-60	<30	NP-8
	4-25	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	25-42	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	42-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Nectar	0-5	Fine sandy loam	SM, ML	A-4	0	95-100	85-100	70-90	40-70	<20	NP-4
	5-16	Silty clay loam, silty clay, clay.	CL, CH	A-6, A-7	0	90-100	85-100	75-99	70-95	35-70	14-40
	16-32	Silty clay loam, silty clay, clay loam.	CL, CH	A-7	0	90-100	85-100	75-99	70-95	40-60	15-30
	32-45	Silty clay loam, gravelly silty clay loam, channery clay loam.	ML	A-4, A-6, A-7	0-5	60-90	55-90	50-90	50-85	35-46	8-17
	45-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
NSC:											
Nauvoo	0-4	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4, A-2	0-3	90-100	85-100	55-93	30-60	<30	NP-8
	4-25	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	25-40	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	40-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sipsey	0-4	Loamy sand	SM	A-2	0-10	85-100	85-100	50-75	15-30	---	NP
	4-16	Sandy loam, loamy sand.	SM, SM-SC	A-2	0-10	85-100	85-100	50-95	15-40	<30	NP-7
	16-31	Sandy loam, loam, sandy clay loam.	SM-SC, SC, CL-ML, CL	A-4, A-6	0-15	85-100	65-100	60-95	35-60	<35	NP-15
	31-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
PrA: Pruitton	0-7	Loam	ML, CL, CL-ML	A-4	0	80-100	75-98	65-95	65-90	20-30	3-10
	7-41	Silt loam, loam	ML, CL, CL-ML	A-4, A-6	0	80-100	75-100	65-97	60-90	20-38	3-15
	41-64	Cherty sandy loam, cherty loam, cherty silt loam.	ML, CL, SM, SC	A-1, A-2, A-4, A-6	0-8	40-90	20-75	20-75	15-70	<30	NP-11
SeE: Sipsey	0-4	Loamy sand	SM	A-2	0-10	85-100	85-100	50-75	15-30	---	NP
	4-16	Sandy loam, loamy sand.	SM, SM-SC	A-2	0-10	85-100	85-100	50-95	15-40	<30	NP-7
	16-31	Sandy loam, loam, sandy clay loam.	SM-SC, SC, CL-ML, CL	A-4, A-6	0-15	85-100	65-100	60-95	35-60	<35	NP-15
	31-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
ShE:											
Sipsey----------	0-4	Loamy sand-------	SM	A-2	0-10	85-100	85-100	50-75	15-30	---	NP
	4-16	Sandy loam, loamy sand.	SM, SM-SC	A-2	0-10	85-100	85-100	50-95	15-40	<30	NP-7
	16-31	Sandy loam, loam, sandy clay loam.	SM-SC, SC, CL-ML, CL	A-4, A-6	0-15	85-100	65-100	60-95	35-60	<35	NP-15
	31-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Bankhead--------	0-4	Sandy loam-------	SM	A-2, A-4	0-5	80-95	75-90	70-85	25-40	<20	NP
	4-26	Sandy loam, channery sandy loam, cobbly sandy loam.	SM, GM	A-2, A-4	0-35	60-95	55-90	50-85	25-45	<20	NP-3
	26-30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SmE-------------- Smithdale	0-18	Sandy loam-------	SM, SM-SC	A-4, A-2	0	100	85-100	60-95	28-49	<20	NP-5
	18-28	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	0	100	85-100	80-96	45-75	23-38	7-16
	28-62	Loam, sandy loam	SM, ML, CL, SC	A-4	0	100	85-100	65-95	36-70	<30	NP-10
SpB:											
Spadra----------	0-7	Fine sandy loam	SM, SM-SC	A-4	0	85-100	80-100	65-80	35-50	<25	NP-7
	7-58	Loam, sandy clay loam, clay loam.	CL, SC	A-4, A-6	0	90-100	90-100	80-95	40-95	25-40	8-15
	58-64	Fine sandy loam, sandy loam, gravelly fine sandy loam.	CL, SM-SC, SC, CL-ML	A-4, A-2, A-1	0	60-100	50-100	40-95	20-75	<30	4-10
Whitwell--------	0-16	Silt loam--------	ML, CL-ML, CL	A-4	0-3	80-100	75-100	70-100	55-95	18-28	3-10
	16-64	Clay loam, loam, silt loam.	CL, CL-ML, ML, SC	A-4, A-6	0-3	80-100	75-100	60-90	40-80	18-35	3-15
SsE:											
Sunlight--------	0-3	Channery silt loam.	SM, ML, GM	A-4	0-5	50-85	50-80	35-70	35-60	<40	NP-10
	3-12	Very channery silt loam, very channery silty clay loam, channery loam.	GC, GM-GC	A-2, A-4, A-1-b, A-6	0-10	40-65	35-60	35-50	20-40	20-40	4-15
	12-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sipsey----------	0-12	Loamy sand-------	SM	A-2	0-10	85-100	85-100	50-75	15-30	---	NP
	12-31	Sandy loam, loam, sandy clay loam.	SM-SC, SC, CL-ML, CL	A-4, A-6	0-15	85-100	65-100	60-95	35-60	<35	NP-15
	31-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
StE:											
Sunlight	0-3	Channery silt loam.	SM, ML, GM	A-4	0-5	50-85	50-80	35-70	35-60	<40	NP-10
	3-5	Channery sandy loam, channery silty clay loam, channery loam.	SM-SC, GC, GM-GC, CL	A-4, A-6	0-10	50-85	50-80	35-70	35-60	20-40	4-15
	5-12	Very channery silt loam, very channery silty clay loam, channery loam.	GC, GM-GC	A-2, A-4, A-1-b, A-6	0-10	40-65	35-60	35-50	20-40	20-40	4-15
	12-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Townley	0-7	Silt loam	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	7-36	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-37
	36-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SuE:											
Sunlight	0-3	Channery silt loam.	SM, ML, GM	A-4	0-5	50-85	50-80	35-70	35-60	<40	NP-10
	3-5	Channery sandy loam, channery silty clay loam, channery loam.	SM-SC, GC, GM-GC, CL	A-4, A-6	0-10	50-85	50-80	35-70	35-60	20-40	4-15
	5-14	Very channery silt loam, very channery silty clay loam, channery loam.	GC, GM-GC	A-2, A-4, A-1-b, A-6	0-10	40-65	35-60	35-50	20-40	20-40	4-15
	14-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Townley	0-5	Silt loam	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	5-36	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-37
	36-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											
ToB, ToD: Townley	0-5	Silt loam	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	5-36	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-37
	36-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
TuC:											
Townley---------	0-5	Silt loam--------	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	5-36	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-7	0-2	75-95	65-95	60-92	55-90	40-72	14-37
	36-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											
WyB, WyC--------- Wynnville	0-10	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0-5	85-100	85-100	70-100	40-70	<25	NP-7
	10-22	Loam, sandy clay loam, silt loam.	SM-SC, SC, CL-ML, CL	A-4	0-5	85-100	85-100	70-100	36-90	15-30	3-10
	22-56	Loam, sandy clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-4, A-6	0-5	85-100	85-100	80-100	36-95	20-35	3-13
	56-64	Loam, sandy clay loam, clay loam.	SM-SC, SC, CL-ML, CL	A-4, A-6	0-5	85-100	85-100	80-100	36-95	20-35	3-13

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AnC--------------	0-6	6-25	1.30-1.50	0.6-2.0	0.14-0.19	4.5-5.5	Low----------	0.28	5	.5-3
Allen	6-41	18-35	1.40-1.60	0.6-2.0	0.12-0.17	4.5-5.5	Low----------	0.20		
	41-64	20-45	1.40-1.60	0.6-2.0	0.10-0.17	4.5-5.5	Low----------	0.20		
BaE:										
Bankhead--------	0-4	5-15	1.40-1.50	2.0-6.0	0.10-0.16	4.5-5.5	Very low-----	0.20	2	.5-2
	4-26	10-18	1.40-1.50	2.0-6.0	0.08-0.16	4.5-5.5	Very low-----	0.17		
	26-30	---	---	---	---	---	-------------	----		
Rock outcrop.										
BcE--------------	0-7	8-25	1.40-1.80	2.0-6.0	0.04-0.10	5.6-7.3	Low----------	0.24	5	<.5
Brilliant	7-84	8-25	1.35-1.80	2.0-6.0	0.04-0.10	5.6-7.3	Low----------	0.24		
BPE:										
Brilliant-------	0-5	8-25	1.40-1.80	2.0-6.0	0.04-0.10	5.6-7.3	Low----------	0.24	5	<.5
	5-60	8-25	1.35-1.80	2.0-6.0	0.04-0.10	5.6-7.3	Low----------	0.24		
Palmerdale------	0-6	7-27	1.40-1.80	2.0-6.0	0.04-0.10	3.6-5.5	Low----------	0.24	5	<.5
	6-60	10-35	1.35-1.80	2.0-6.0	0.04-0.10	3.6-5.5	Low----------	0.24		
McE--------------	0-3	7-27	1.25-1.45	0.6-2.0	0.09-0.18	4.5-6.0	Low----------	0.28	1	.5-2
Montevallo	3-12	15-35	1.25-1.50	0.6-2.0	0.02-0.12	4.5-6.0	Low----------	0.32		
	12-60	---	---	---	---	---	-------------	----		
MoA--------------	0-8	5-27	1.40-1.50	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.37	5	.5-2
Mooreville	8-45	18-35	1.40-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Moderate-----	0.28		
	45-60	10-40	1.40-1.60	0.6-2.0	0.14-0.18	4.5-5.5	Moderate-----	0.28		
MsA:										
Mooreville------	0-6	5-27	1.40-1.50	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.37	5	.5-2
	6-40	18-35	1.40-1.50	0.6-2.0	0.14-0.18	4.5-5.5	Moderate-----	0.28		
	40-62	10-40	1.40-1.60	0.6-2.0	0.14-0.18	4.5-5.5	Moderate-----	0.28		
Spadra----------	0-7	5-20	1.35-1.60	0.6-2.0	0.11-0.15	4.5-6.0	Low----------	0.28	5	1-3
	7-55	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.32		
	55-62	15-25	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low----------	0.24		
NaE:										
Nauvoo----------	0-4	10-25	1.30-1.60	2.0-6.0	0.13-0.17	4.5-6.0	Low----------	0.28	3	.5-2
	4-33	18-35	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.32		
	33-40	15-30	1.30-1.60	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.32		
	40-60	---	---	---	---	---	-------------	----		
Townley---------	0-5	10-27	1.30-1.60	0.6-2.0	0.12-0.14	3.6-5.5	Low----------	0.37	2	<1
	5-31	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate-----	0.28		
	31-60	---	---	---	---	---	-------------	----		
NcC:										
Nauvoo----------	0-5	10-25	1.30-1.60	2.0-6.0	0.13-0.17	4.5-6.0	Low----------	0.28	3	.5-2
	5-32	18-35	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.32		
	32-45	15-30	1.30-1.60	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.32		
	45-60	---	---	---	---	---	-------------	----		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
NcC:										
Sipsey----------	0-12	6-20	1.35-1.50	2.0-6.0	0.10-0.16	4.5-6.0	Very low-----	0.24	2	.5-2
	12-31	15-35	1.40-1.60	0.6-2.0	0.14-0.18	4.5-6.0	Very low-----	0.32		
	31-60	---	---	---	---	---	-------------	----		
Urban land.										
NnB:										
Nauvoo----------	0-4	10-25	1.30-1.60	2.0-6.0	0.13-0.17	4.5-6.0	Low----------	0.28	3	.5-2
	4-25	18-35	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.32		
	25-42	15-30	1.30-1.60	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.32		
	42-60	---	---	---	---	---	-------------	----		
Nectar----------	0-5	4-20	1.30-1.60	0.6-2.0	0.12-0.16	5.1-6.0	Low----------	0.28	3	.5-2
	5-16	35-55	1.20-1.50	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.32		
	16-32	28-45	1.30-1.60	0.2-0.6	0.12-0.18	3.6-5.5	Moderate-----	0.32		
	32-45	20-40	1.20-1.50	0.2-2.0	0.06-0.12	3.6-5.5	Low----------	0.28		
	45-60	---	---	---	---	---	-------------	----		
NSC:										
Nauvoo----------	0-4	10-25	1.30-1.60	2.0-6.0	0.13-0.17	4.5-6.0	Low----------	0.28	3	.5-2
	4-25	18-35	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.32		
	25-40	15-30	1.30-1.60	0.6-2.0	0.11-0.17	4.5-6.0	Low----------	0.32		
	40-60	---	---	---	---	---	-------------	----		
Sipsey----------	0-4	2-10	1.35-1.50	6.0-20	0.05-0.12	4.5-6.0	Very low-----	0.15	2	.5-2
	4-16	2-10	1.35-1.50	6.0-20	0.05-0.12	4.5-6.0	Very low-----	0.15		
	16-31	15-35	1.40-1.60	0.6-2.0	0.14-0.18	4.5-6.0	Very low-----	0.32		
	31-60	---	---	---	---	---	-------------	----		
PrA-------------- Pruitton	0-7	10-28	---	2.0-6.0	0.18-0.22	4.5-6.0	Low----------	0.37	5	2-4
	7-41	18-32	---	2.0-6.0	0.16-0.20	4.5-6.0	Low----------	0.32		
	41-64	7-25	---	2.0-6.0	0.05-0.12	4.5-6.0	Low----------	0.24		
SeE-------------- Sipsey	0-4	2-10	1.35-1.50	6.0-20	0.05-0.12	4.5-6.0	Very low-----	0.15	2	.5-2
	4-16	2-10	1.35-1.50	6.0-20	0.05-0.12	4.5-6.0	Very low-----	0.15		
	16-31	15-35	1.40-1.60	0.6-2.0	0.14-0.18	4.5-6.0	Very low-----	0.32		
	31-60	---	---	---	---	---	-------------	----		
ShE:										
Sipsey----------	0-4	2-10	1.35-1.50	6.0-20	0.05-0.12	4.5-6.0	Very low-----	0.15	2	.5-2
	4-16	2-10	1.35-1.50	6.0-20	0.05-0.12	4.5-6.0	Very low-----	0.15		
	16-31	15-35	1.40-1.60	0.6-2.0	0.14-0.18	4.5-6.0	Very low-----	0.32		
	31-60	---	---	---	---	---	-------------	----		
Bankhead--------	0-4	5-15	1.40-1.50	2.0-6.0	0.10-0.16	4.5-5.5	Very low-----	0.20	2	.5-2
	4-26	10-18	1.40-1.50	2.0-6.0	0.08-0.16	4.5-5.5	Very low-----	0.17		
	26-30	---	---	---	---	---	-------------	----		
SmE-------------- Smithdale	0-18	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28	5	.5-2
	18-28	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.24		
	28-62	12-27	1.40-1.55	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28		
SpB:										
Spadra----------	0-7	10-25	1.30-1.60	0.6-2.0	0.11-0.24	4.5-6.0	Low----------	0.37	5	1-3
	7-58	18-35	1.30-1.60	0.6-2.0	0.12-0.20	4.5-6.0	Low----------	0.32		
	58-64	15-25	1.30-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low----------	0.24		
Whitwell--------	0-16	10-25	1.35-1.55	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.32	5	1-3
	16-64	18-32	1.40-1.70	0.6-2.0	0.14-0.20	4.5-5.5	Low----------	0.32		

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
SsE:										
Sunlight	0-3	10-27	1.40-1.60	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.24	1	1-2
	3-12	18-35	1.50-1.70	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.17		
	12-60	---	---	---	---	---	-------------	----		
Sipsey	0-12	2-10	1.35-1.50	6.0-20	0.05-0.12	4.5-6.0	Very low	0.15	2	.5-2
	12-31	15-35	1.40-1.60	0.6-2.0	0.14-0.18	4.5-6.0	Very low	0.32		
	31-60	---	---	---	---	---	-------------	----		
StE:										
Sunlight	0-3	10-27	1.40-1.60	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.24	1	1-2
	3-5	10-35	1.40-1.60	0.6-2.0	0.08-0.18	4.5-5.5	Low	0.24		
	5-12	18-35	1.50-1.70	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.17		
	12-60	---	---	---	---	---	-------------	----		
Townley	0-7	10-27	1.30-1.60	0.6-2.0	0.12-0.14	3.6-5.5	Low	0.37	2	<1
	7-36	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate	0.28		
	36-60	---	---	---	---	---	-------------	----		
SuE:										
Sunlight	0-3	10-27	1.40-1.60	0.6-2.0	0.08-0.14	4.5-5.5	Low	0.24	1	1-2
	3-5	10-35	1.40-1.60	0.6-2.0	0.08-0.18	4.5-5.5	Low	0.24		
	5-14	18-35	1.50-1.70	0.6-2.0	0.10-0.18	4.5-5.5	Low	0.17		
	14-60	---	---	---	---	---	-------------	----		
Townley	0-5	10-27	1.30-1.60	0.6-2.0	0.12-0.14	3.6-5.5	Low	0.37	2	<1
	5-36	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate	0.28		
	36-60	---	---	---	---	---	-------------	----		
Urban land.										
ToB, ToD: Townley	0-5	10-27	1.30-1.60	0.6-2.0	0.12-0.14	3.6-5.5	Low	0.37	2	<1
	5-36	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate	0.28		
	36-60	---	---	---	---	---	-------------	----		
TuC:										
Townley	0-5	10-27	1.30-1.60	0.6-2.0	0.12-0.14	3.6-5.5	Low	0.37	2	<1
	5-36	35-60	1.30-1.60	0.06-0.2	0.12-0.18	3.6-5.5	Moderate	0.28		
	36-60	---	---	---	---	---	-------------	----		
Urban land.										
WyB, WyC: Wynnville	0-10	5-16	1.30-1.60	0.6-2.0	0.15-0.20	3.6-5.5	Low	0.24	3	<1
	10-22	18-30	1.40-1.60	0.6-2.0	0.15-0.20	3.6-5.5	Low	0.24		
	22-56	10-25	1.60-1.75	0.06-0.2	0.08-0.12	3.6-5.5	Low	0.20		
	56-64	14-35	1.40-1.60	0.2-0.6	0.12-0.17	3.6-5.5	Low	0.20		

TABLE 16.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
AnC: Allen	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
BaE: Bankhead	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
Rock outcrop.											
BcE: Brilliant	B	None	---	---	>6.0	---	---	>60	---	Low	Low.
BPE: Brilliant	B	None	---	---	>6.0	---	---	>60	---	Low	Low.
Palmerdale	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
McE: Montevallo	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate.
MoA: Mooreville	C	Frequent	Brief to long.	Jan-Mar	1.5-3.0	Apparent	Jan-Mar	>60	---	Moderate	High.
MsA: Mooreville	C	Frequent	Brief to long.	Jan-Mar	1.5-3.0	Apparent	Jan-Mar	>60	---	Moderate	High.
Spadra	B	Occasional	Very brief to brief.	Dec-Apr	>6.0	---	---	>60	---	Low	High.
NaE: Nauvoo	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
Townley	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
NcC: Nauvoo	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
Sipsey	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
Urban land.											
NnB: Nauvoo	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
Nectar	C	None	---	---	>6.0	---	---	40-60	Soft	Moderate	High.
NSC: Nauvoo	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
Sipsey	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
PrA: Pruitton	B	Frequent	Brief	Nov-Mar	>6.0	---	---	>60	---	Low	Moderate.
SeE: Sipsey	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
ShE:											
Sipsey	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
Bankhead	B	None	---	---	>6.0	---	---	20-40	Hard	Low	High.
SmE Smithdale	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
SpB:											
Spadra	B	Occasional	Very brief to brief.	Dec-Apr	>6.0	---	---	>60	---	Low	High.
Whitwell	C	Occasional	Very brief	Dec-Mar	2.0-3.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
SsE:											
Sunlight	D	None	---	---	>6.0	---	---	10-20	Soft	Low	High.
Sipsey	B	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
StE:											
Sunlight	D	None	---	---	>6.0	---	---	10-20	Soft	Low	High.
Townley	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
SuE:											
Sunlight	D	None	---	---	>6.0	---	---	10-20	Soft	Low	High.
Townley	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
Urban land.											
ToB, ToD Townley	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
TuC:											
Townley	C	None	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
Urban land.											
WyB, WyC Wynnville	C	None	---	---	1.5-2.5	Perched	Dec-Feb	48-60	Hard	Moderate	High.

TABLE 17.--PHYSICAL ANALYSIS OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Particle-size distribution (percent less than 2.0 mm)		
			Sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
	In				
Bankhead*:	0-4	A	76.4	13.3	10.3
S83AL-127-9	4-13	Bw1	76.9	12.1	11.0
	13-26	Bw2	76.7	15.9	7.4
Nectar*:	0-5	Ap	58.3	31.2	10.5
S79AL-127-4	5-16	Bt1	35.1	22.8	42.1
	16-32	Bt2	40.6	23.1	36.3
	32-45	Bt3	53.7	18.2	28.1
	45-60	Cr	64.3	17.9	17.8
Sipsey*:	0-4	A	77.1	19.0	3.9
S83AL-127-8	4-10	E	72.5	20.6	6.9
	10-16	EB	72.7	22.2	5.1
	16-31	Bt	57.0	14.0	29.0
Sunlight*:	C 3	A	20.9	53.7	25.4
S85AL-127-12	3-5	Bt1	15.5	56.7	27.8
	5-12	Bt2	8.5	56.1	35.4
Townley**:	0-2	A	14.1	69.4	16.5
S79AL-127-2	2-6	AB	6.5	72.1	21.4
	6-19	Bt1	4.0	50.3	45.7
	19-30	Bt2	3.1	49.2	47.7
	30-50	Cr	7.9	55.0	37.1
Whitwell*:	0-8	Ap	35.1	52.8	12.1
S84AL-127-4	8-16	BE	34.0	51.4	14.6
	16-27	Bt1	34.5	49.2	16.3
	27-45	Bt2	32.5	47.3	20.2
	45-52	Bt3	42.4	40.0	17.6
	52-64	C	50.0	30.8	19.2
Wynnville***:	0-3	A	29.4	65.5	5.1
S79AL-127-3	3-8	BE	28.3	64.6	7.1
	8-25	Bt	25.4	55.4	19.2
	25-30	Bx1	22.7	55.7	21.6
	30-38	Bx2	21.1	54.1	24.8
	38-72	B't	23.1	53.1	23.8

* See "Soil Series and Their Morphology" for pedon location.

** Pedon location is 1,800 feet east and 1,600 feet south of the southwest corner of sec. 28, T. 12 S., R. 10 W.

*** Pedon location is 1,400 feet east and 1,000 feet south of the northwest corner of sec. 22, T. 13 S., R. 7 W.

TABLE 18.--CHEMICAL ANALYSIS OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Extractable bases			Extractable acidity	Base saturation	Reaction	Cation-exchange capacity
			Ca	Mg	K				
	In		Meq/100g				Pct	pH	
Bankhead*:	0-4	A	0.70	0.18	0.09	3.52	21.51	4.5	4.48
S83AL-127-9	4-13	Bw1	0.25	0.08	0.05	3.12	10.73	4.8	3.50
	13-26	Bw2	0.25	0.08	0.05	2.24	14.43	4.8	2.62
Nectar*:	0-5	Ap	1.16	0.44	0.04	3.76	30.37	5.2	5.40
S79AL-127-4	5-16	Bt1	0.84	0.60	0.04	8.88	14.29	4.9	10.36
	16-32	Bt2	0.32	0.52	0.04	8.48	9.79	5.0	9.40
	32-45	Bt3	0.12	0.20	0.04	7.04	4.86	5.2	7.40
	45-60	Cr	0.12	0.08	0.04	5.44	4.23	5.1	5.68
Sipsey*:	0-4	A	0.82	0.08	0.08	3.20	23.40	4.8	4.18
S83AL-127-8	4-10	E	0.22	0.04	0.03	3.04	8.70	4.8	3.33
	10-16	EB	0.45	0.06	0.03	2.32	18.80	5.0	2.86
	16-31	Bt	0.35	0.72	0.19	6.16	16.90	4.8	7.42
Townley**:	0-2	A	1.60	0.40	0.16	7.60	22.13	5.0	9.76
S79AL-127-2	2-6	AB	0.28	0.16	0.12	8.00	6.54	4.6	8.56
	6-19	Bt1	0.32	1.24	0.08	10.24	13.80	4.9	11.88
	19-30	Bt2	0.20	2.12	0.12	10.80	18.43	4.9	13.24
	30-50	Cr	0.12	3.16	0.16	9.28	27.04	4.7	12.72
Whitwell*:	0-8	Ap	0.55	0.62	0.04	2.56	31.98	5.2	3.76
S84AL-127-4	8-16	BE	0.30	1.00	0.04	3.68	26.77	5.3	5.03
	16-27	Bt1	0.20	1.38	0.05	4.24	27.79	5.3	5.87
	27-45	Bt2	0.33	1.64	0.06	3.92	34.06	5.3	5.94
	45-52	Bt3	0.30	1.98	0.07	4.72	33.25	5.2	7.07
	52-64	C	0.35	0.12	0.04	4.24	10.72	4.7	4.75
Wynnville***:	0-3	A	1.00	0.20	0.08	8.48	13.11	4.8	9.76
S79AL-127-3	3-8	BE	0.24	0.04	0.04	3.76	7.84	5.2	4.08
	8-25	Bt	0.84	0.32	0.04	4.64	20.55	5.0	5.84
	25-30	Bx1	0.36	0.24	0.04	6.56	8.89	4.9	7.20
	30-38	Bx2	0.20	0.28	0.04	7.76	6.28	4.8	8.28
	38-72	B't	0.08	0.20	0.04	7.36	4.17	5.0	7.68

* See "Soil Series and Their Morphology" for pedon location.

** Pedon location is 1,800 feet east and 1,600 feet south of the southwest corner of sec. 28, T. 12 S., R. 10 W.

*** Pedon location is 1,400 feet east and 1,000 feet south of the northwest corner of sec. 22, T. 13 S., R. 7 W.

TABLE 19.--ENGINEERING INDEX TEST DATA

(Dashes indicate data were not available. NP means nonplastic)

Soil name, report number, horizon, and depth in inches	Classification		Grain-size distribution										Moisture density	
			Percentage passing sieve--							Percentage smaller than .005 mm	Liquid limit	Plasticity index	Maximum dry density	Optimum moisture
	AASHTO	Unified	2 inches	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200					
											Pct		Lb/ft^3	Pct
Smithdale*: (S84AL-127-2)														
BE----- 6 to 18	A-2-4(0)	SM-SC	100	100	100	96	95	95	20	11	NP	NP	114.4	10.1
Bt1---- 18 to 28	A-2-4(0)	SM-SC	100	100	100	100	99	96	34	32	22	4	110.6	13.8
Bt2---- 28 to 62	A-2-4(0)	SM-SC	100	100	100	100	99	97	27	24	18	NP	109.6	15.9
Spadra*: (S84AL-127-1)														
Ap----- 0 to 7	A-4(0)	SM-SC	100	100	100	100	100	100	45	16	NP	NP	104.8	13.9
Bt1---- 7 to 21	A-4(0)	ML-CL	100	100	100	100	100	100	60	27	---	---	109.3	13.3
Bt3---- 33 to 53	A-4(1)	ML-CL	100	100	100	100	100	100	70	39	23	4	110.8	13.6
Whitwell*: (S84AL-127-4)														
Ap----- 0 to 8	A-4(2)	ML	100	100	100	98	97	99	76	37	30	4	103.4	16.7
Bt1---- 16 to 27	A-4(0)	ML-CL	100	100	100	99	98	98	72	42	21	3	111.7	12.7

* See "Soil Series and Their Morphology" for pedon location.

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Bankhead	Coarse-loamy, siliceous, thermic Typic Dystrochrepts
Brilliant	Loamy-skeletal, mixed, nonacid, thermic Typic Udorthents
Montevallo	Loamy-skeletal, mixed, thermic, shallow Typic Dystrochrepts
Mooreville	Fine-loamy, siliceous, thermic Fluvaquentic Dystrochrepts
Nauvoo	Fine-loamy, siliceous, thermic Typic Hapludults
Nectar	Clayey, kaolinitic, thermic Typic Hapludults
Palmerdale	Loamy-skeletal, mixed, acid, thermic Typic Udorthents
Pruitton	Fine-loamy, siliceous, thermic Fluventic Dystrochrepts
Sipsey	Fine-loamy, siliceous, thermic Typic Hapludults
Smithdale	Fine-loamy, siliceous, thermic Typic Hapludults
Spadra	Fine-loamy, siliceous, thermic Typic Hapludults
Sunlight	Loamy-skeletal, mixed, thermic, shallow Ochreptic Hapludults
Townley	Clayey, mixed, thermic Typic Hapludults
Whitwell	Fine-loamy, siliceous, thermic Aquic Hapludults
Wynnville	Fine-loamy, siliceous, thermic Glossic Fragiudults

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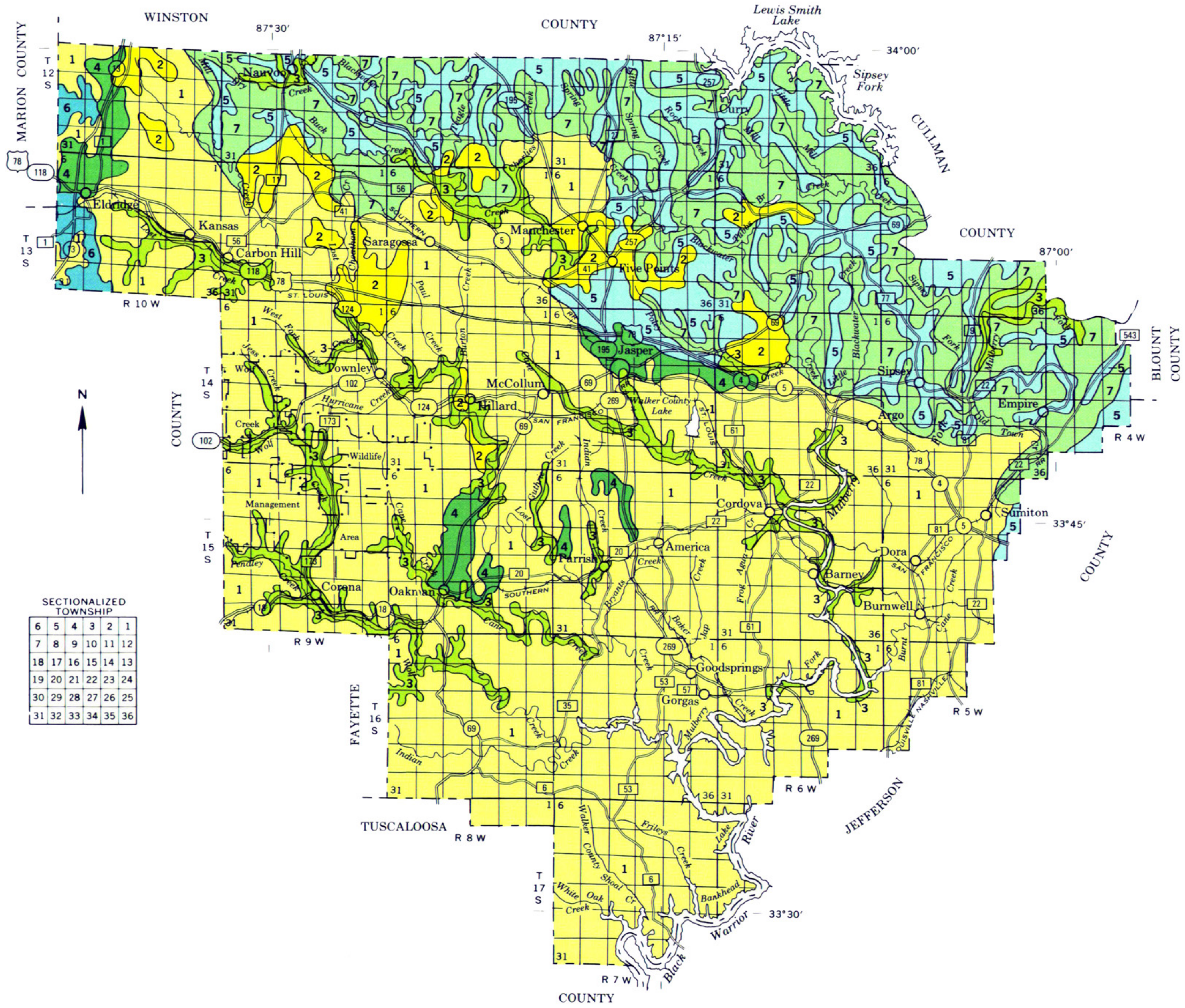


SOIL LEGEND

1 — SUNLIGHT-TOWNLEY-SIPSEY: Moderately deep and shallow, gently sloping to very steep, well drained soils that have a loamy or clayey subsoil; formed in material weathered from shale, siltstone, and sandstone

2 — WYNNVILLE-SIPSEY-TOWNLEY: Deep and moderately deep, nearly level to strongly sloping, moderately well drained and well drained soils that have a loamy or clayey subsoil; formed in loamy colluvium and material weathered from sandstone and shale

3 — SPADRA-WHITWELL-MOOREVILLE: Deep, nearly level and gently sloping, well drained and moderately well drained soils that have a loamy subsoil; formed in fluvial and alluvial deposits

4 — TOWNLEY-SUNLIGHT: Moderately deep and shallow, gently sloping to moderately steep, well drained soils that have a clayey or loamy subsoil; formed in material weathered from shale, siltstone, and sandstone

5 — SIPSEY-NAUVOO: Moderately deep and deep, gently sloping to moderately steep, well drained soils that have a loamy subsoil; formed in material weathered from sandstone or sandstone interbedded with siltstone and shale

6 — SMITHDALE-TOWNLEY: Deep and moderately deep, strongly sloping to steep, well drained soils that have a loamy or clayey subsoil; formed in loamy marine sediments and material weathered from shale and siltstone

7 — SIPSEY-BANKHEAD: Moderately deep, strongly sloping to very steep, well drained soils that have a loamy subsoil; formed in material weathered from sandstone

Compiled 1990

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ALABAMA AGRICULTURAL EXPERIMENT STATION
ALABAMA SOIL AND WATER CONSERVATION COMMITTEE

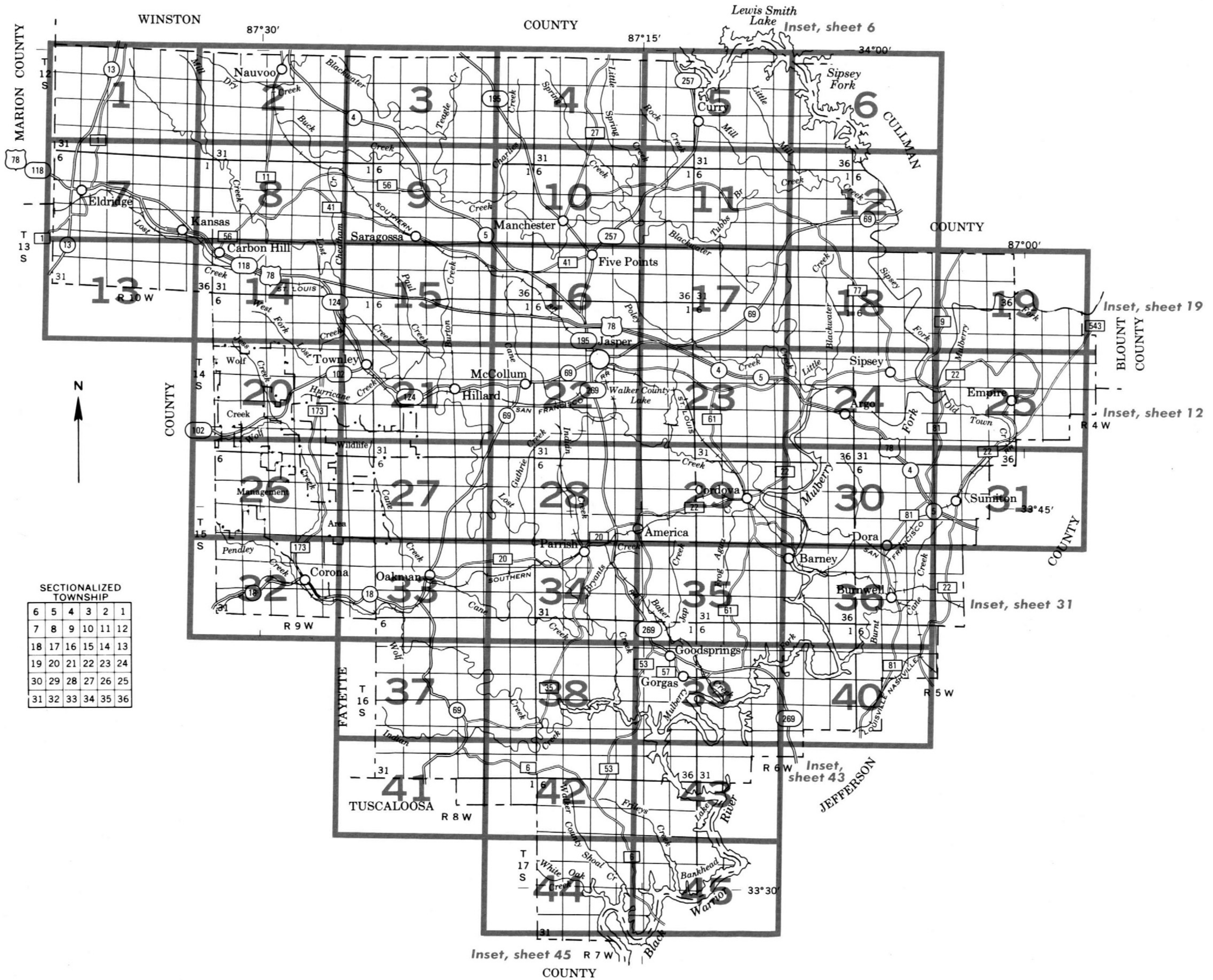
GENERAL SOIL MAP

WALKER COUNTY, ALABAMA

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km



Original text from each individual map sheet read:
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1977 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS

WALKER COUNTY, ALABAMA

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km

SOIL LEGEND

Soil map symbols and map unit names are alphabetical. The first letter, always a capital, is the initial letter of the soil name. The second letter is a small letter, except in undifferentiated map units, in which it is a capital letter, and identifies either the second named taxon in the map unit or is used for alphabetical purposes. The third letter, always a capital, denotes slope class.

SYMBOL	NAME
AnC	Allen loam, 4 to 10 percent slopes
BaE	Bankhead-Rock outcrop complex, 15 to 60 percent slopes
BcE	Brilliant extremely channery loam, 6 to 40 percent slopes
BPE	Brilliant and Palmerdale extremely channery loams, 6 to 60 percent slopes
McE	Montevallo channery silt loam, 30 to 60 percent slopes
MoA	Mooreville silt loam, 0 to 1 percent slopes, frequently flooded
MsA	Mooreville frequently flooded-Spadra occasionally flooded complex, 0 to 3 percent slopes
NaE	Nauvoo-Townley complex, 4 to 20 percent slopes
NcC	Nauvoo-Sipsey-Urban land complex, 2 to 12 percent slopes
NnB	Nauvoo and Nectar fine sandy loams, 2 to 6 percent slopes
NSC	Nauvoo and Sipsey soils, 6 to 12 percent slopes
PrA	Pruitton loam, 0 to 2 percent slopes, frequently flooded
SeE	Sipsey loamy sand, 4 to 18 percent slopes
ShE	Sipsey-Bankhead complex, 15 to 45 percent slopes
SmE	Smithdale sandy loam, 8 to 25 percent slopes
SpB	Spadra-Whitwell complex, 0 to 3 percent slopes, occasionally flooded
SsE	Sunlight-Sipsey complex, 15 to 40 percent slopes
StE	Sunlight-Townley complex, 15 to 45 percent slopes
SuE	Sunlight-Townley-Urban land complex, 15 to 45 percent slopes
ToB	Townley silt loam, 2 to 6 percent slopes
ToD	Townley silt loam, 6 to 15 percent slopes
TuC	Townley-Urban land complex, 2 to 15 percent slopes
WyB	Wynnville fine sandy loam, 0 to 4 percent slopes
WyC	Wynnville fine sandy loam, 4 to 8 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Swift Airport

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot (as large as 5 acres)

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — AnC SuE

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

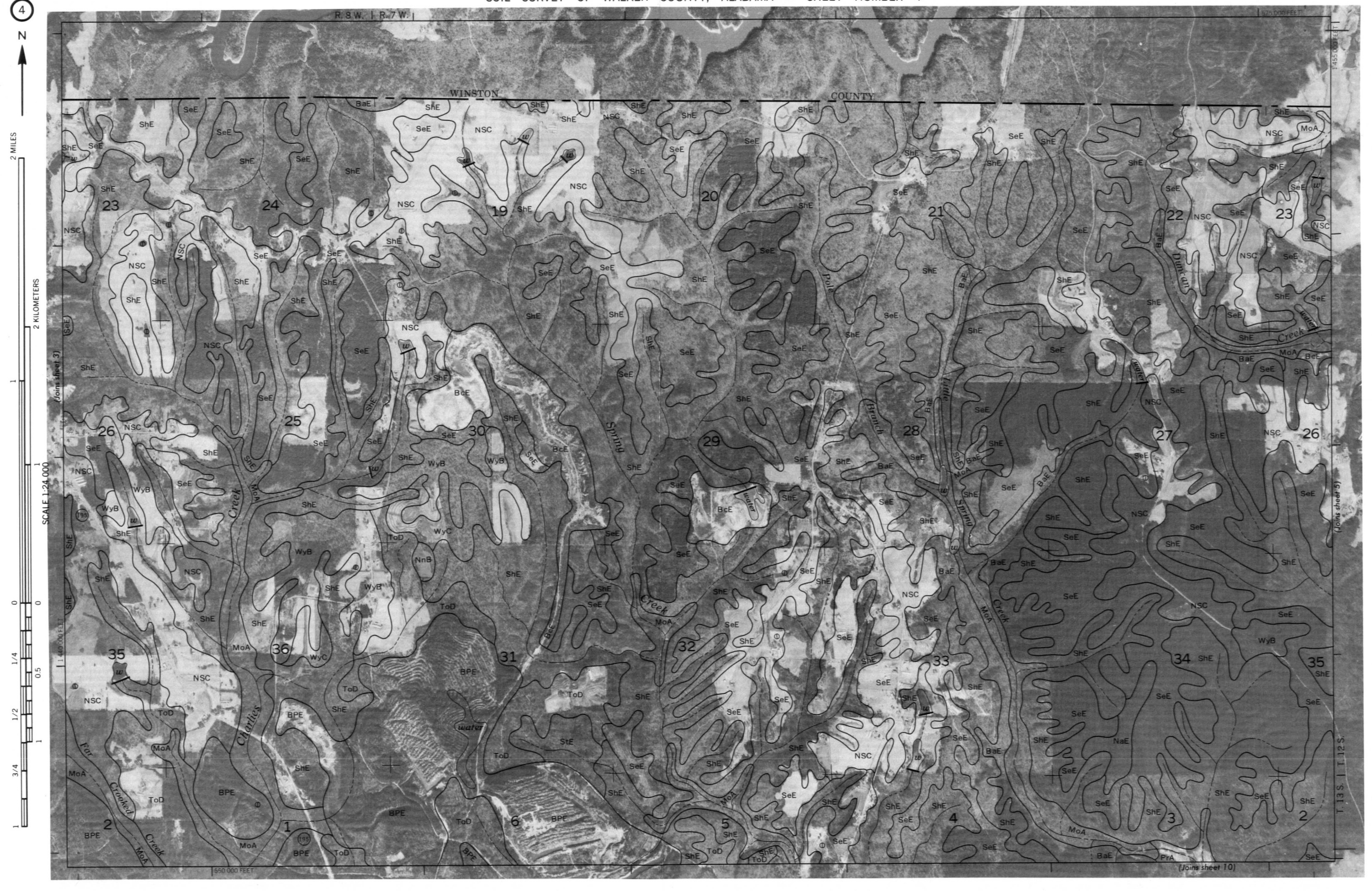
MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Small water bodies (as large as 5 acres)

SOIL SURVEY OF WALKER COUNTY, ALABAMA — SHEET NUMBER 1


2
N
R. 10 W. | R. 9 W.
WINSTON COUNTY
Nauvoo
Flatwood
Little Blackwater Creek
Dry Creek
Panther Branch
Camp Creek
Buck Creek
Mill Creek
SOUTHERN
water
Scale 1:24 000
2 Miles
10 000 Feet
(Joins sheet 1)
(Joins sheet 3)
(Joins sheet 8)
T. 13 S. | T. 12 S.
490 000 FEET
1 440 000 FEET
519 000 FEET
1 456 000 FEET


3
N
R. 9 W. | R. 8 W.
520 000 FEET
1 495 000 FEET
WINSTON
COUNTY
Bunkum
Creek
Little
Blackwater
Flat
Branch
Wilson
Branch
Gum
Fork
Teagle
Creek
Home
Far
Crooked
Panther
Branch
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 9)
T. 12 S.
T. 13 S.
1 440 000 FEET
545 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000
195
water
w
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
1
2
3
4
5
6

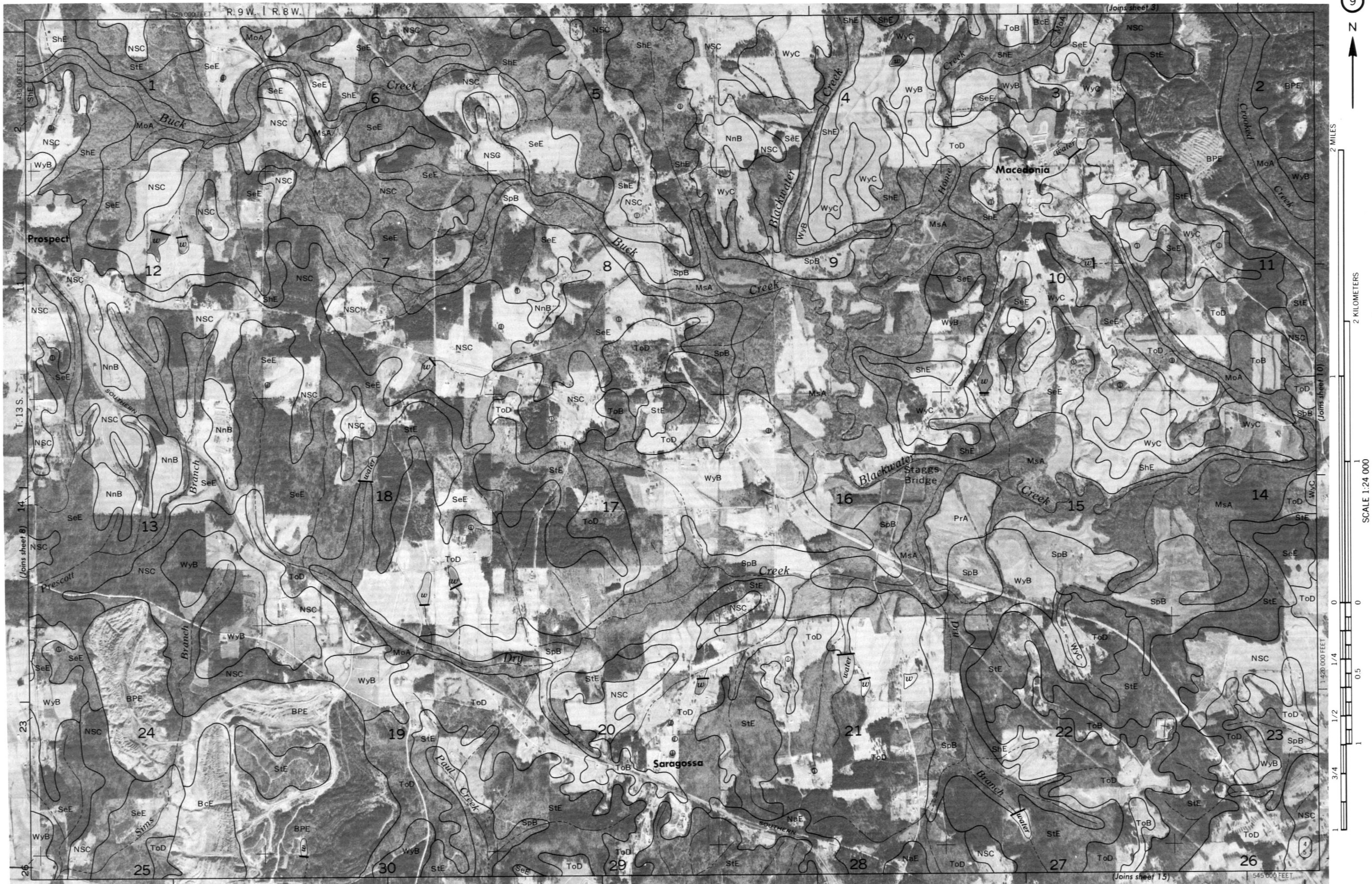

4
N
2 MILES
2 KILOMETERS
SCALE 1:24 000
R. 8 W. | R. 7 W.
WINSTON
COUNTY
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 10)
T. 12 S.
T. 13 S.
550 000 FEET
575 000 FEET
1 440 000 FEET
1 455 000 FEET
Charlies Creek
Spring Creek
Little Spring Creek
Pole Branch
Duncan Creek
Far Crooked Creek
water


5
N
WINSTON COUNTY
SIPSEY FORK OF LEWIS SMITH LAKE
Bottle Branch
Duncan Creek
Mill Creek
Little Mill Creek
Rock Creek
Marylee
Curry
(Joins sheet 4)
(Joins sheet 6)
(Joins sheet 11)
(Joins inset, sheet 6)
R. 7 W. | R. 6 W.
T. 13 S. | T. 12 S.
580 000 FEET
SCALE 1:24 000
2 MILES
2 KILOMETERS


N
2 Miles
10000 Feet
5000
0
1000
2000
3000
4000
5000
Scale 1:24000
WINSTON COUNTY
SIPSEY FORK OF LEWIS SMITH LAKE
CULLMAN COUNTY
(Joins sheet 5)
(Joins sheet 12)
610 000 FEET
R. 6 W. | R. 5 W.
T. 12 S.
T. 13 S.
ShE
SeE
BaE
BPE
NSC
ToD
22
23
26
27
34
35
36
1
2
3
6
595 000 FEET
605 000 FEET
1 448 000 FEET
1 445 000 FEET
WINSTON COUNTY
SIPSEY FORK OF LEWIS SMITH LAKE
17
16
15
R. 6 W.
(Joins sheet 5)
3000 AND 5000-FOOT GRID TICKS

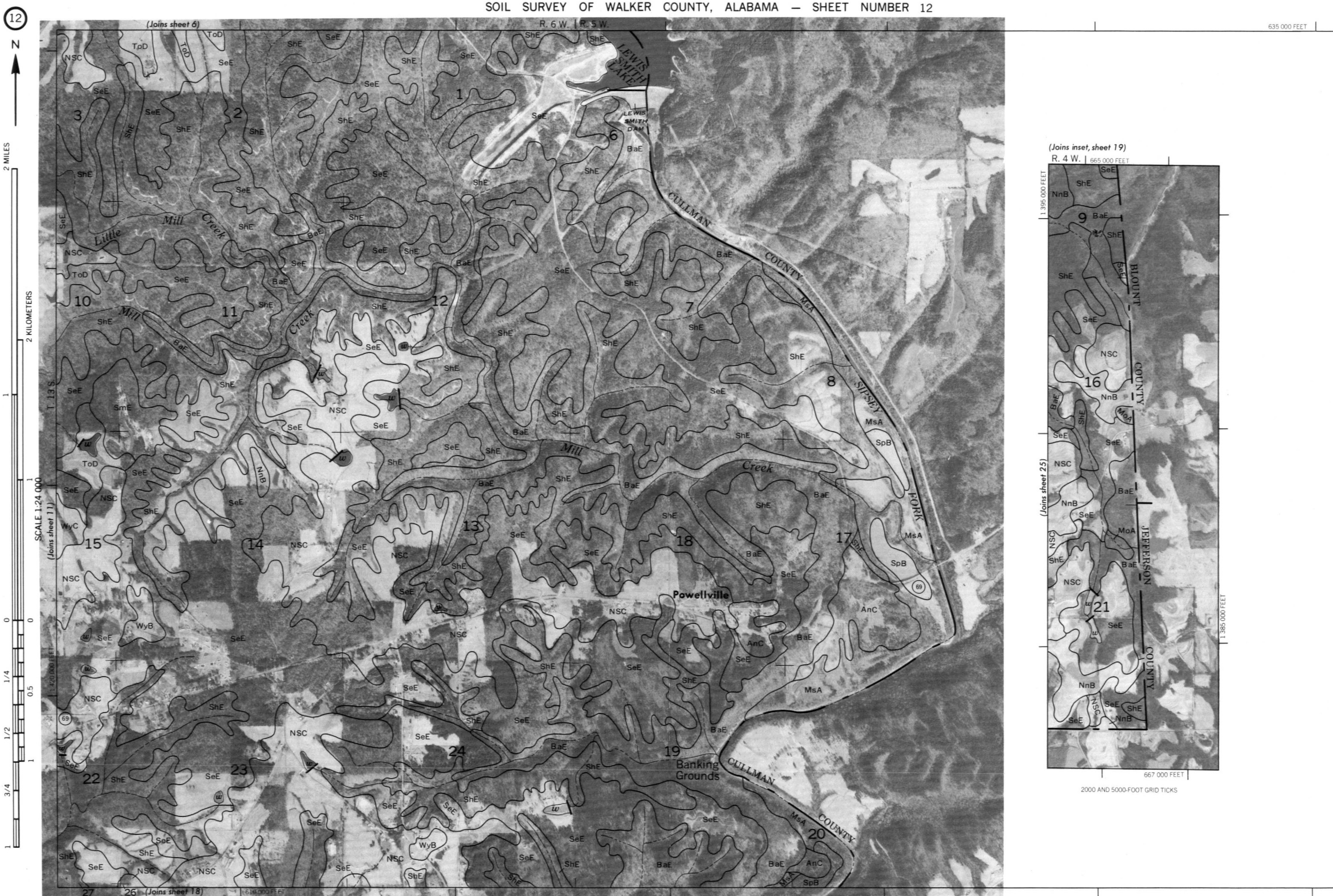

7
N
(Joins sheet 1)
(Joins sheet 8)
(Joins sheet 13)
R. 10 W.
T. 13 S.
460 000 FEET
435 000 FEET
485 000 FEET
MARION COUNTY
FAYETTE COUNTY
Eldridge
Clarke
Kansas
Sleepy Mountain
Humphrey Branch
Freeman Branch
Mallards Camp Springs Br
Camp Creek
Trinity Creek
Lost Creek
Barron Creek
BURLINGTON NORTHERN
SCALE 1:24 000
2 MILES
2 KILOMETERS

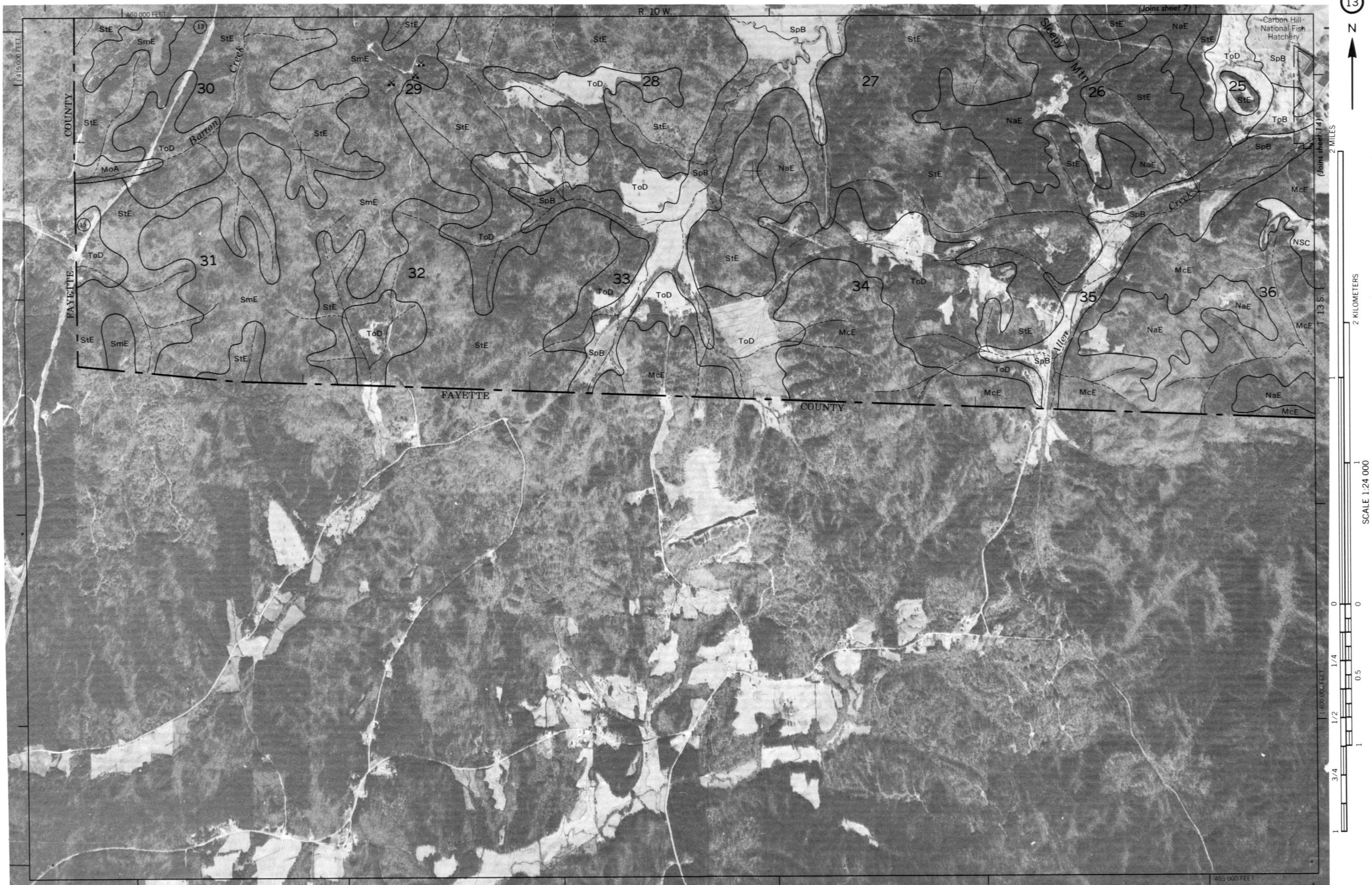

R. 10 W.
R. 9 W.
N
(Joins sheet 2)
(Joins sheet 7)
(Joins sheet 9)
(Joins sheet 14)
Flatwood
Prospect
Seamore Mountain
CARBON HILL
Mill Creek
Buck Creek
Branch
Cliffty
Rabbit
Indian
Lemond
Creek
Cheatham Creek
Cheatham Branch
Prescott Branch
Lost Creek
SOUTHERN
BURLINGTON
NORTHERN
T. 13 S.
2 MILES
2 KILOMETERS
SCALE 1:24 000
1
0
1/4
1/2
3/4
0.5
515 000 FEET
430 000 FEET
1 420 000 FEET
25


9
N
(Joins sheet 3)
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 15)
R. 9 W. | R. 8 W.
T. 13 S.
Prospect
Macedonia
Staggs Bridge
Saragossa
Buck Creek
Blackwater Creek
Crooked Creek
Home Creek
Dry Creek
Paul Creek
Prescott Branch
Sims
SOUTHERN
2 MILES
2 KILOMETERS
SCALE 1:24 000
545 000 FEET
1 420 000 FEET


N
2 MILES
2 KILOMETERS
SCALE 1:24 000
(Joins sheet 4)
R. 8 W. | R. 7 W.
(Joins sheet 9)
(Joins sheet 11)
(Joins sheet 16)
T. 13 S.
1 435 000 FEET
1 420 000 FEET
575 000 FEET
550 000 FEET
Marigold
Manchester
South Lowell
Five Points
Charlies Creek
Blackwater Creek
Spring Creek
Little Spring Creek
water
BPE
ToD
MoA
NSC
StE
WyB
WyC
BcE
SeE
ShE
BaE
PrA
SpB
MsA
TuC
ToB
NnB
NcC
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

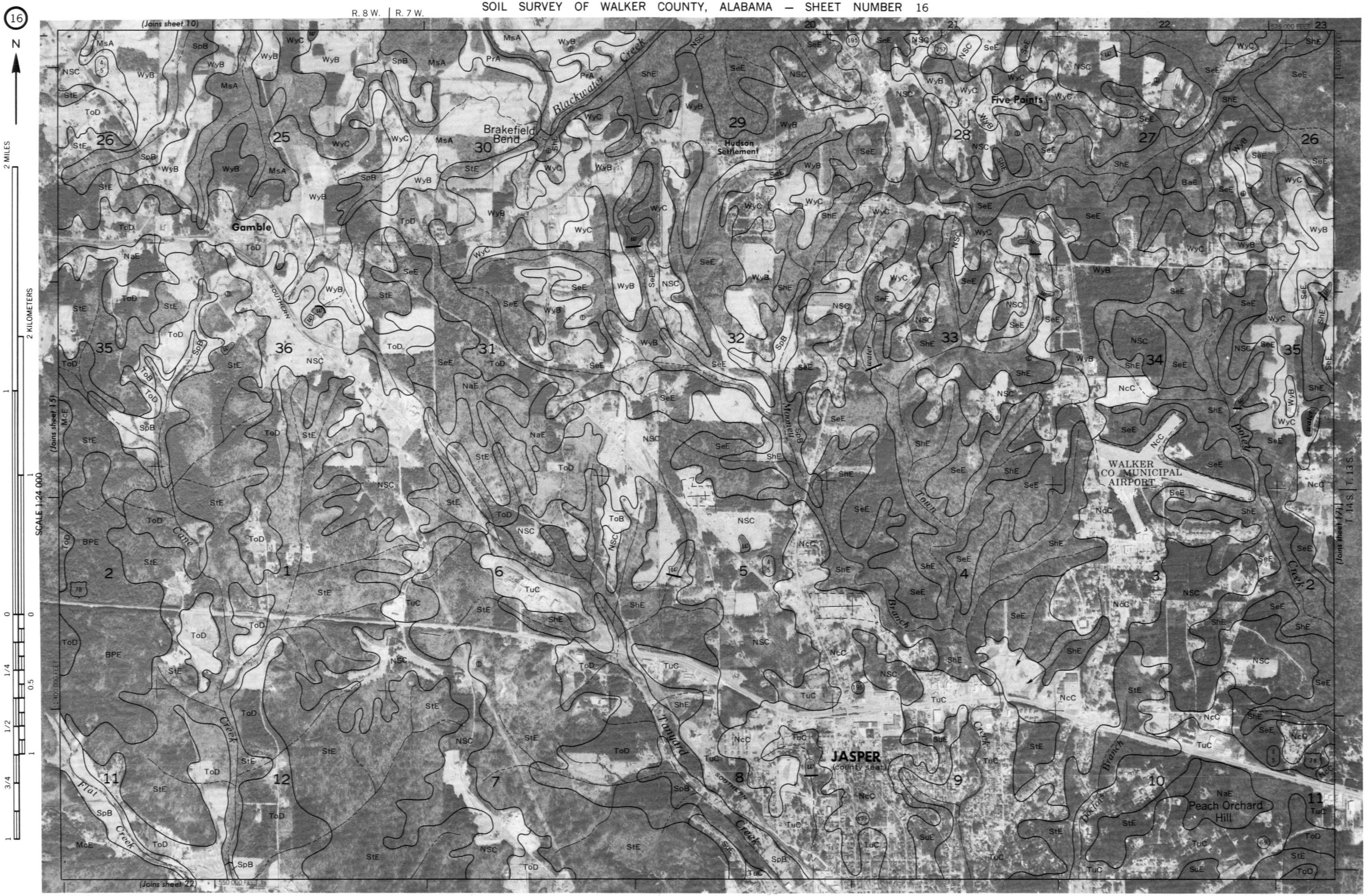

11
N
R. 7 W. | R. 6 W.
580 000 FEET
(Joins sheet 5)
(Joins sheet 12)
(Joins sheet 17)
(Joins sheet 10)
T. 13 S.
605 000 FEET
SUNLIGHT
Burrows Crossroads
Walston Bridge
Rock Creek
Mill Creek
Little Mill Creek
Blackwater Creek
Thompson Branch
Ice Branch
Tubbs
Branch
water
26
25
30
29
28
27
2 MILES
2 KILOMETERS
SCALE 1:24 000


12
N
(Joins sheet 6)
R. 6 W.
R. 5 W.
LEWIS SMITH LAKE
LEWIS SMITH DAM
Little Mill Creek
Mill Creek
CULLMAN COUNTY
SIPSEY FORK
Powellville
Banking Grounds
69
T. 13 S.
(Joins sheet 11)
(Joins sheet 18)
SCALE 1:24 000
2 MILES
2 KILOMETERS
635 000 FEET
1 430 000 FEET
1 420 000 FEET
610 000 FEET
(Joins inset, sheet 19)
R. 4 W.
665 000 FEET
1 395 000 FEET
BLOUNT COUNTY
JEFFERSON COUNTY
(Joins sheet 25)
1 385 000 FEET
667 000 FEET
2000 AND 5000-FOOT GRID TICKS
ShE
SeE
NSC
ToD
BaE
MsA
SpB
AnC
NnB
SmE
WyC
WyB
MoA


13
(Joins sheet 7)
(Joins sheet 14)
R. 10 W.
T. 13 S.
Carbon Hill National Fish Hatchery
Sleepy Mtn
Barron Creek
Allen Creek
FAYETTE COUNTY
FAYETTE
COUNTY
460 000 FEET
1 415 000 FEET
485 000 FEET
1 400 000 FEET
N
SCALE 1:24 000
2 MILES
2 KILOMETERS
StE
SmE
ToD
SpB
NaE
McE
MoA
NSC
25
26
27
28
29
30
31
32
33
34
35
36


14
R. 10 W. | R. 9 W.
N
(Joins sheet 8)
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 20)
CARBON HILL
Carbon Hill National Fish Hatchery
Pocahontas
Cedrum
Cedrum Mountain
FAYETTE COUNTY
FAYETTE
COUNTY
LOST CREEK
Mill Creek
Cheatham Creek
Crawford Creek
Brannon Creek
Downey Branch
West Fork
Gum Suck Hollow
Jim Br
Lost Creek
BURLINGTON NORTHERN
water
W C W M A
T. 13 S.
T. 14 S.
490 000 FEET
1 400 000 FEET
515 000 FEET
1 415 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000
1
0
1/4
1/2
3/4
0.5
25
30
29
28
27
26
25
36
31
32
33
34
35
36
6
5
4
3
2
1
7
8
9
10
11
12
BPE
StE
ToD
McE
NaE
SpB
NSC
SeE
BaE
ShE
WyB
WyC
ToB
PrA
TuC
NnB


15
N
R. 9 W. | R. 8 W.
(Joins sheet 9)
(Joins sheet 14)
(Joins sheet 16)
(Joins sheet 21)
T. 14 S. | T. 13 S.
2 MILES
2 KILOMETERS
SCALE 1:24 000
Gamble Station
Horseshoe Mountain
McCleskey Hill
Holly Grove
Dark Hollow
Richard Branch
Baker Branch
Burton Creek
Cold Branch
Right Fork
Paul Creek
Lost Branch
Miner River
Beau River
Flat Creek
SOUTHERN
ST. LOUIS SAN FRANCISCO
water

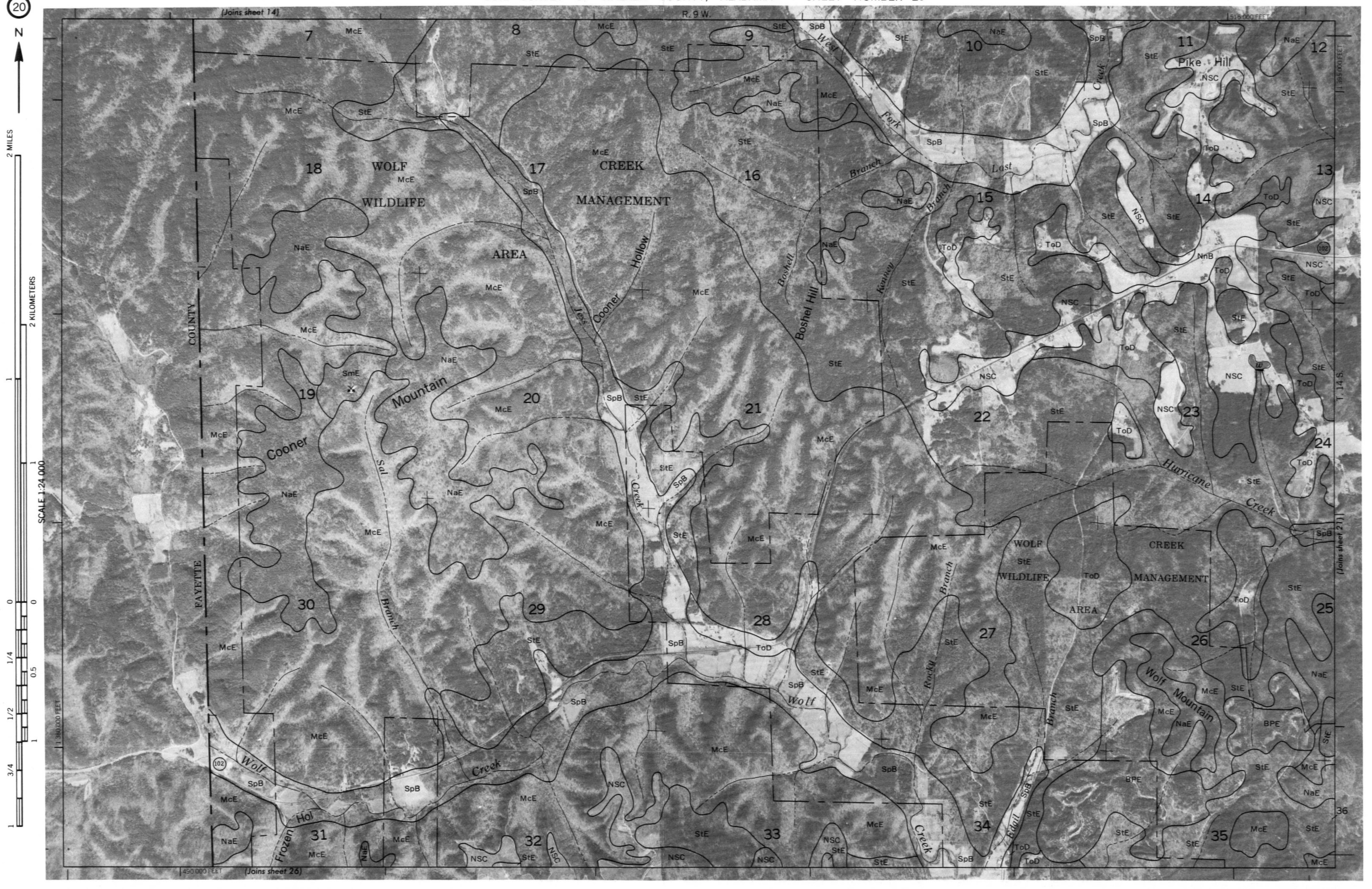

16
N
2 MILES
2 KILOMETERS
SCALE 1:24 000
R. 8 W.
R. 7 W.
(Joins sheet 10)
(Joins sheet 15)
(Joins sheet 17)
(Joins sheet 22)
T. 13 S.
T. 14 S.
Gamble
Brakefield Bend
Blackwater Creek
Hudson Settlement
Five Points
SOUTHERN
Cane Creek
Moores
Town Branch
Tanyard Creek
Flat Creek
Doctors Branch
WALKER CO MUNICIPAL AIRPORT
JASPER
(county seat)
Peach Orchard Hill

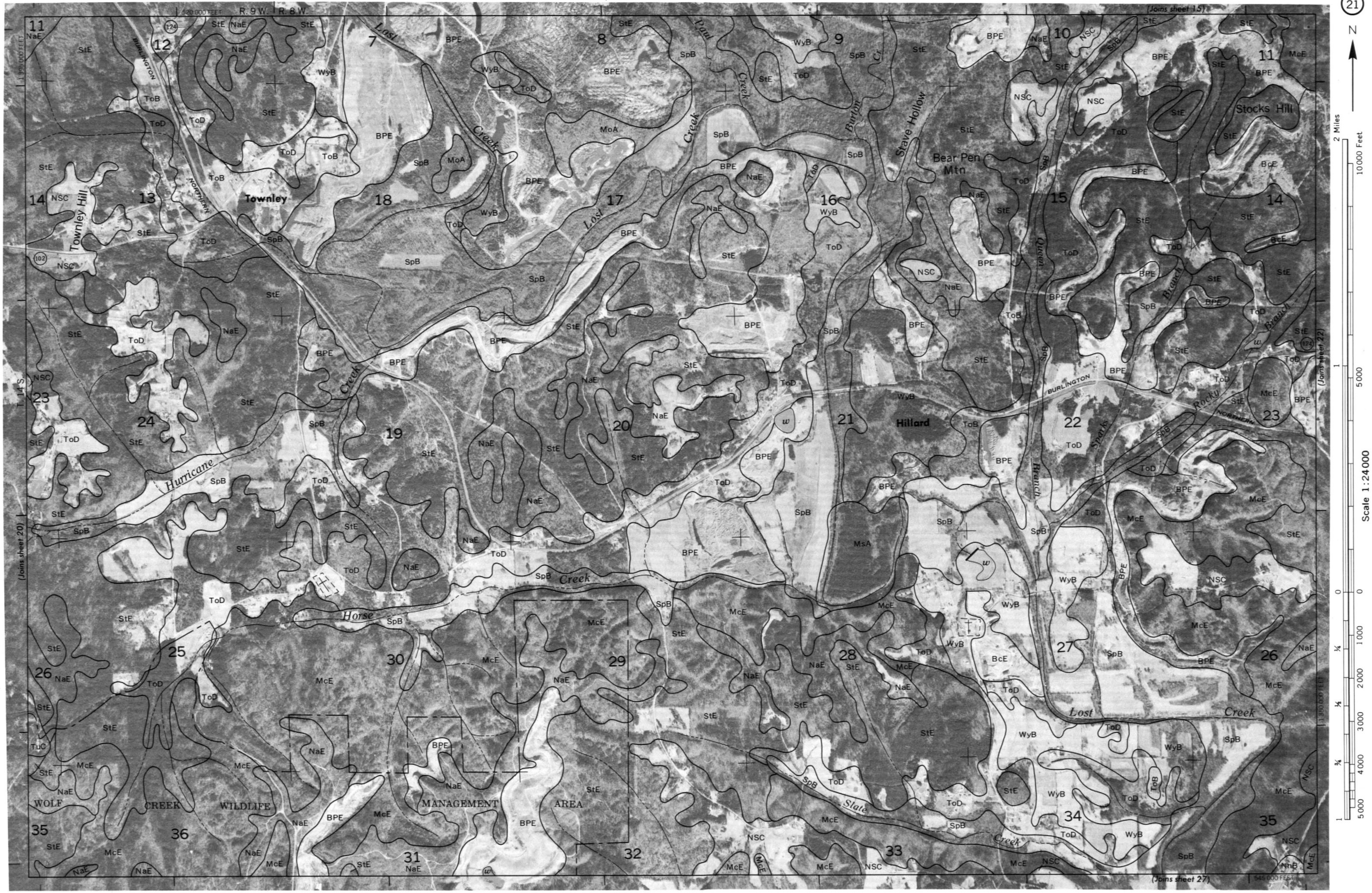

17
N
(Joins sheet 11)
(Joins sheet 18)
(Joins sheet 23)
(Joins sheet 16)
R. 7 W. | R. 6 W.
T. 13 S.
T. 14 S.
580 000 FEET
605 000 FEET
400 000 FEET
Blackwater Creek
Blackwater Branch
Thompson Creek
Ice Branch
Gode Branch
Poley Creek
Baldo
Sims Ponds
2 MILES
2 KILOMETERS
SCALE 1:24 000

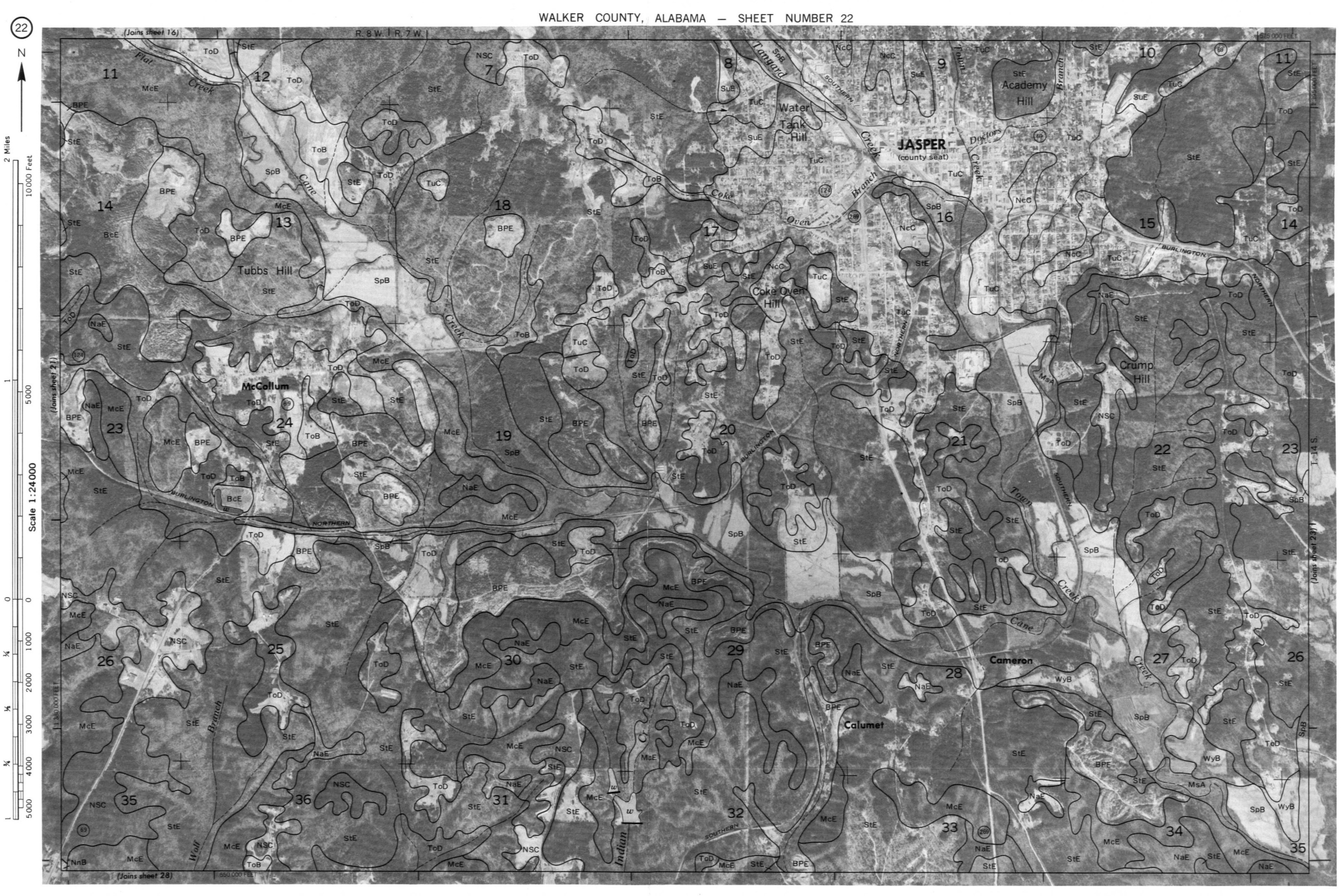

N
2 MILES
2 KILOMETERS
SCALE 1:24 000
(Joins sheet 12)
R. 6 W. | R. 5 W.
CULLMAN COUNTY
Drummond
Wilson Branch
Jim Light Br
Leeth Hill
Leeth Creek
SIPSEY FORK
Drummond Bend
Little Blackwater
Cow Creek
Branch
Blackwater Creek
Hollow Branch
Clark Creek
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 24)
T. 13 S.
T. 14 S.
water

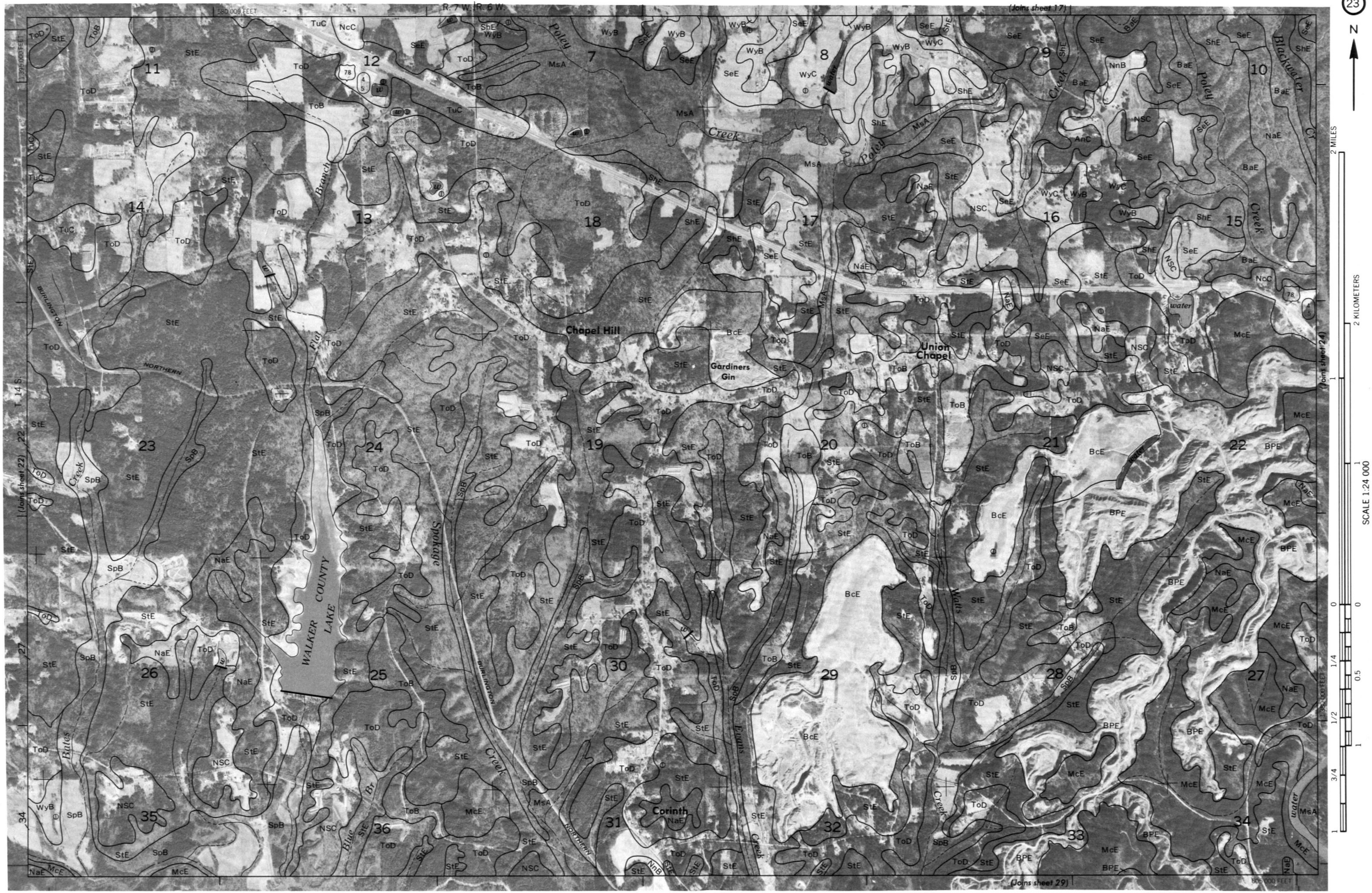

19
N
CULLMAN COUNTY
BLOUNT COUNTY
MULBERRY FORK
Mullen Branch
Walker Co. Br.
McCarne Mountain
Hollow
Drummand
No Business
Campbellville
T. 13 S.
T. 14 S.
(Joins sheet 18)
(Joins sheet 25)
(Joins inset)
R. 5 W.
R. 4 W.
665 000 FEET
1 400 000 FEET
1 395 000 FEET
667 000 FEET
T. 14 S.
(Joins lower right)
(Joins inset, sheet 12)
2000 AND 4000-FOOT GRID TICKS
2 MILES
2 KILOMETERS
SCALE 1:24 000

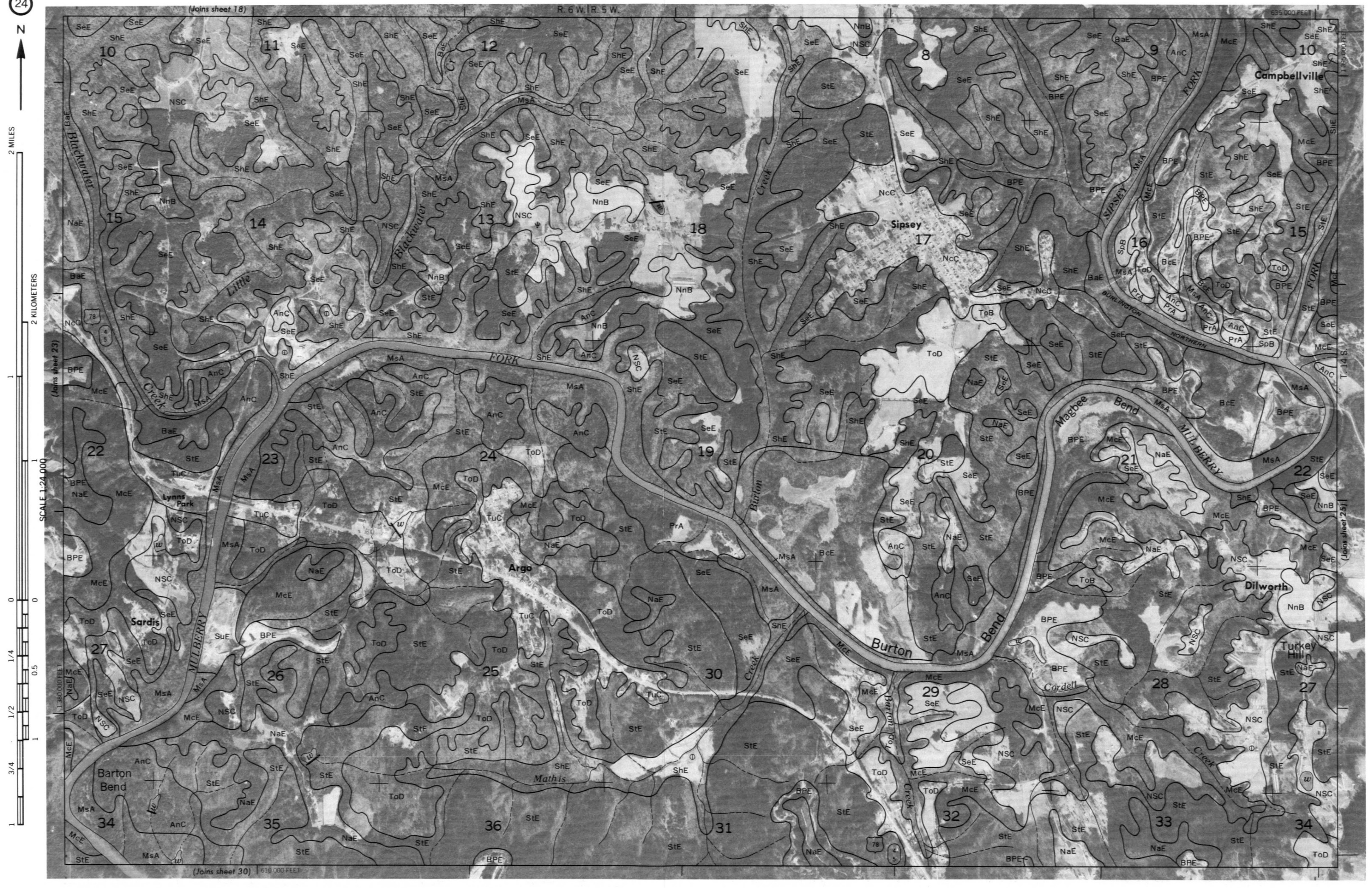
SOIL SURVEY OF WALKER COUNTY, ALABAMA — SHEET NUMBER 20

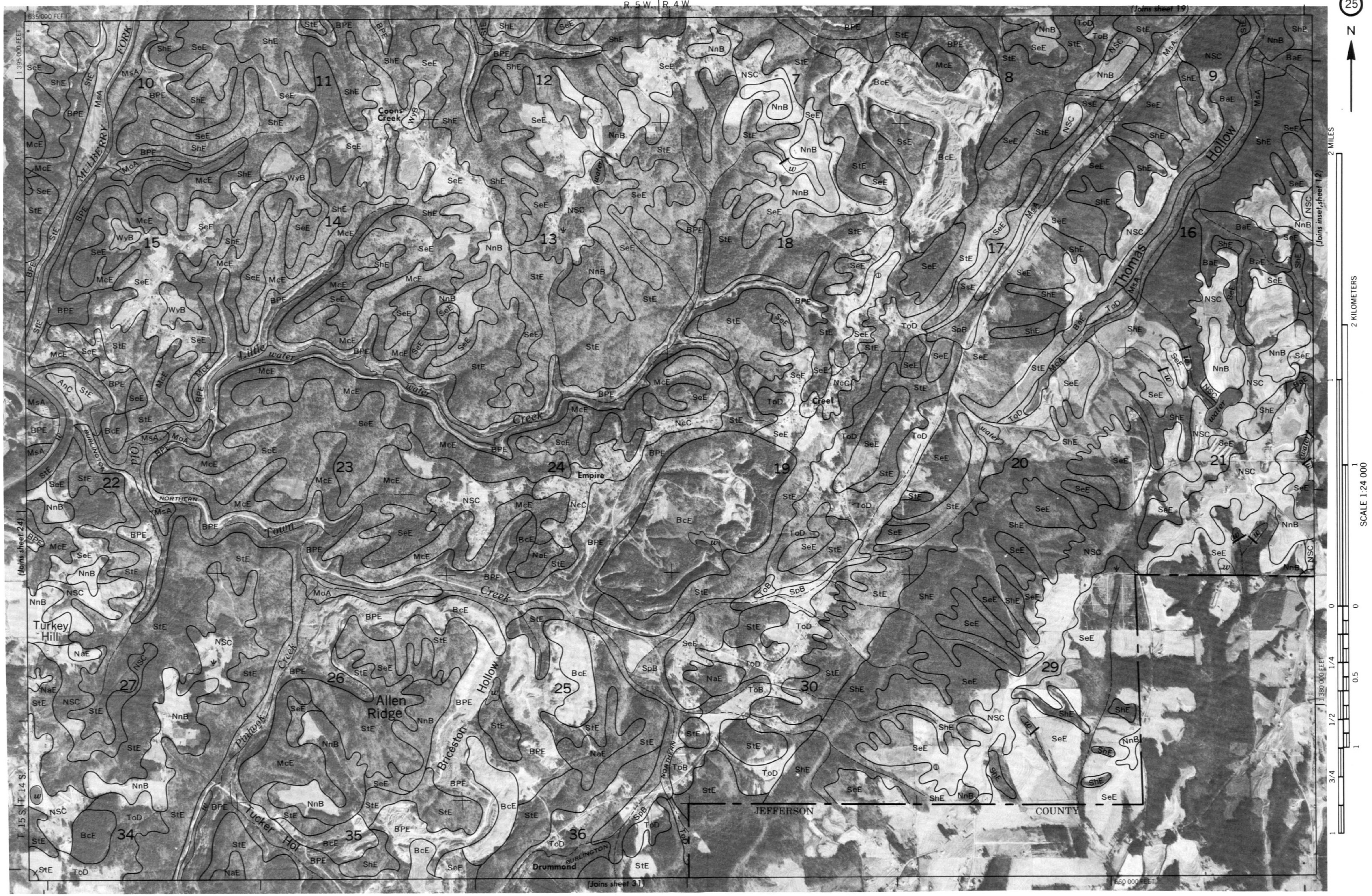


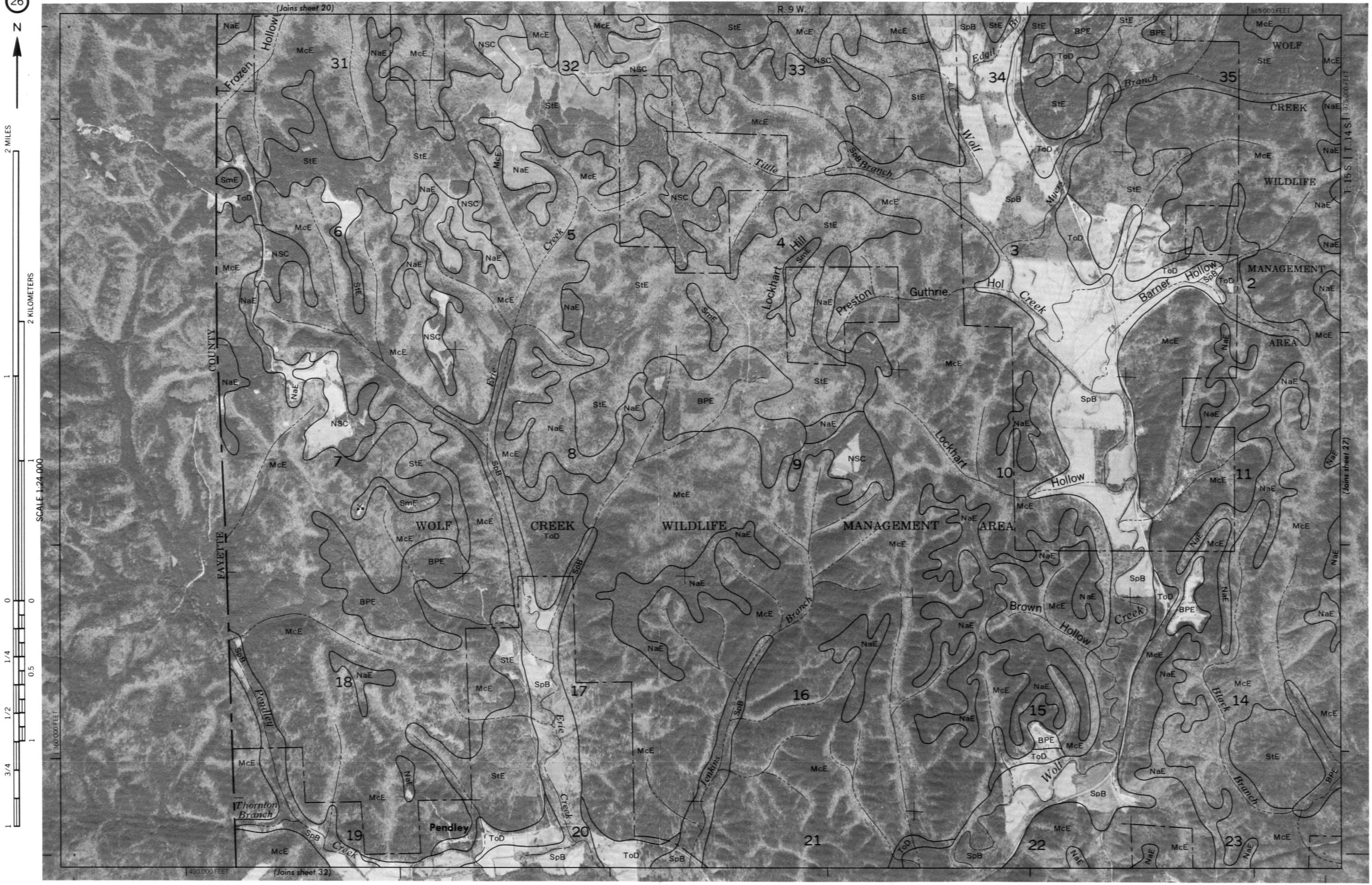

(Joins sheet 15)
(Joins sheet 20)
(Joins sheet 22)
(Joins sheet 27)
R. 9 W. | R. 8 W.
520 000 FEET
1 350 000 FEET
545 000 FEET
T. 14 S.
Townley
Townley Hill
Bear Pen Mtn
Stocks Hill
Hillard
Lost Creek
Paul Creek
Burton Cr.
Stave Hollow
Queen Branch
Sparks Branch
Rocky Branch
Hurricane Creek
Horse Creek
Slate Creek
BURLINGTON NORTHERN
WOLF CREEK WILDLIFE MANAGEMENT AREA
124
102
N
2 Miles
10000 Feet
Scale 1:24000


22
N
2 Miles
10000 Feet
Scale 1:24000
(Joins sheet 16)
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 28)
R. 8 W. | R. 7 W.
T. 14 S.
JASPER
(county seat)
Academy Hill
Water Tank Hill
Coke Oven Hill
Tubbs Hill
Crump Hill
McCollum
Cameron
Calumet
BURLINGTON
NORTHERN
SOUTHERN
Flat Creek
Cane Creek
Town Creek
Doctors Creek
Coke Oven Branch
Tangard
Town Branch
Wolf Branch
Indian Cr.


23
N
R. 7 W. R. 6 W.
(Joins sheet 17)
(Joins sheet 22)
(Joins sheet 24)
(Joins sheet 29)
T. 14 S.
Chapel Hill
Gardiners Gin
Union Chapel
Corinth
WALKER COUNTY LAKE
Poley Creek
Blackwater Cr
Flat Branch
Spokage Creek
Evans Creek
Watts Creek
Bates Creek
Blue Br
BURLINGTON NORTHERN
2 MILES
2 KILOMETERS
SCALE 1:24 000


24
N
(Joins sheet 18)
R. 6 W. | R. 5 W.
635 000 FEET
Campbellville
Sipsey
Blackwater
Little
Creek
FORK
SIPSEY
FORK
BURLINGTON
NORTHERN
Magbee
Bend
MULBERRY
Burton
Creek
Lynns
Park
Argo
Sardis
MULBERRY
Burton
Bend
Dilworth
Turkey
Hill
Cordell
Creek
Barton
Bend
Mathis
(Joins sheet 23)
(Joins sheet 25)
T. 14 S.
(Joins sheet 30)
610 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000
78


25
N
R. 5 W. | R. 4 W.
(Joins sheet 19)
(Joins sheet 24)
(Joins inset, sheet 12)
(Joins sheet 31)
Mulberry Fork
Coons Creek
Little Warrior Creek
Thomas Hollow
Empire
Creel
Turkey Hill
Allen Ridge
Briceston Hollow
Pinhook Creek
Tucker Hollow
Town Creek
Drummond
Northern
Burlington
JEFFERSON COUNTY
T. 15 S. | T. 14 S.
2 MILES
2 KILOMETERS
SCALE 1:24 000


N
SCALE 1:24 000
2 MILES
2 KILOMETERS
(Joins sheet 20)
(Joins sheet 27)
(Joins sheet 32)
R. 9 W.
T. 15 S. | T. 14 S.
515 000 FEET
375 000 FEET
1 360 000 FEET
490 000 FEET
FAYETTE COUNTY
WOLF CREEK WILDLIFE MANAGEMENT AREA
Frozen Hollow
Erie Creek
Tittle Branch
Edgil Br.
Wolf Branch
Myers
Wolf Creek
Lockhart Hill
Preston
Guthrie
Hol Creek
Barner Hollow
Lockhart Hollow
Brown Hollow
Jenkins Branch
Pendley Creek
Thornton Branch
Pendley
Black Branch
31
32
33
34
35
6
5
4
3
2
7
8
9
10
11
18
17
16
15
14
19
20
21
22
23
NaE
McE
StE
NSC
SmE
ToD
SpB
BPE


27
N
(Joins sheet 21)
(Joins sheet 26)
(Joins sheet 28)
(Joins sheet 33)
R. 9 W.
R. 8 W.
T. 14 S.
T. 15 S.
520 000 FEET
545 000 FEET
WOLF
CREEK
WILDLIFE
MANAGEMENT
AREA
Pumpkin
Creek
Slate
Creek
Round
Mountain
Thorn
Hill
Simmons
Branch
Lost
Creek
Wolf
Creek
Branch
Tubbs
Bridge
Cane
Creek
Shelton
Branch
Cowcumber
Hill
Coal
Valley
Black
Branch
Patton
Hill
Bend
Appling
Kings
Mill
69
2 MILES
2 KILOMETERS
SCALE 1:24 000
1
1/2
1/4
0
3/4
0.5

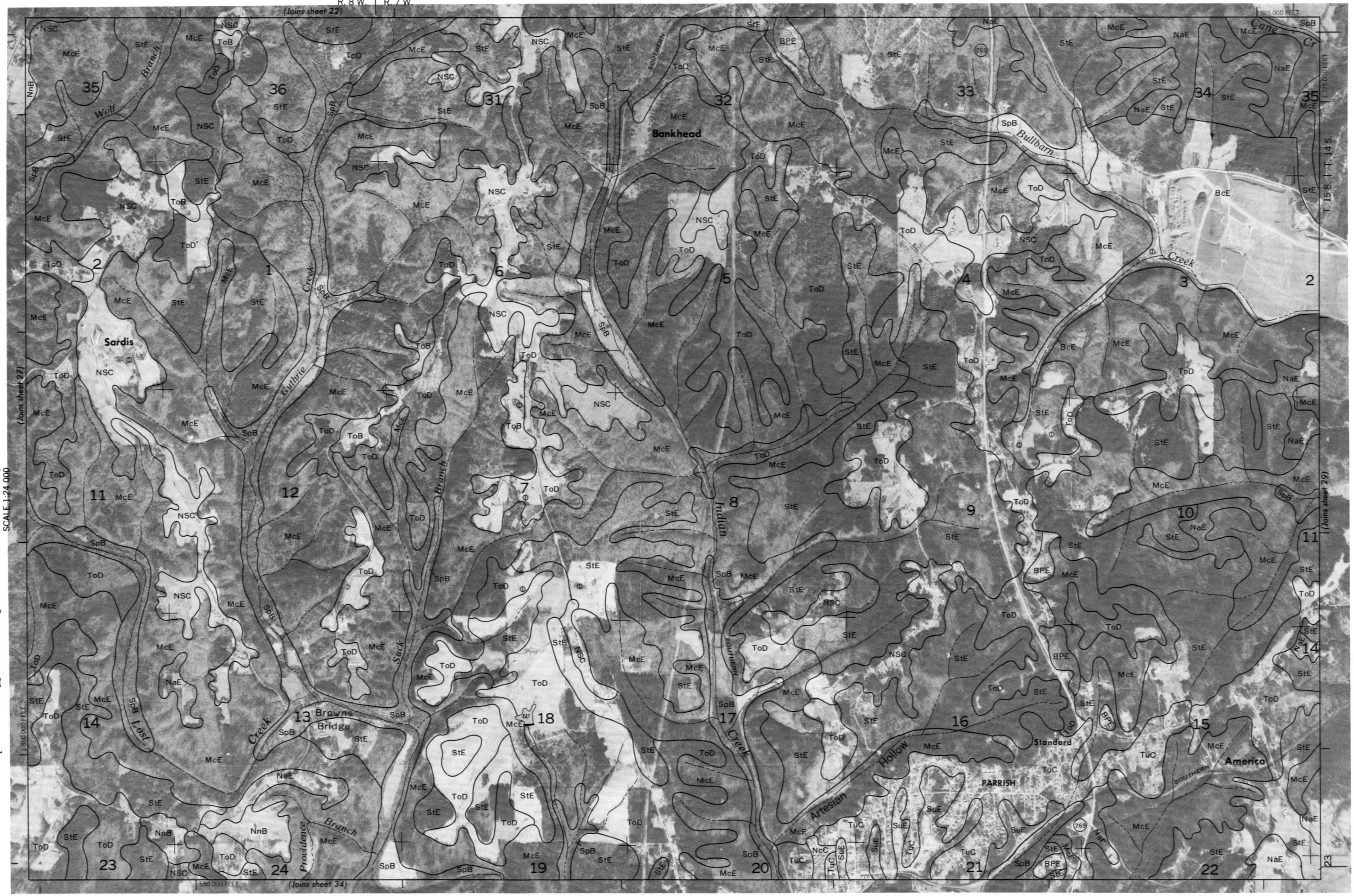
28

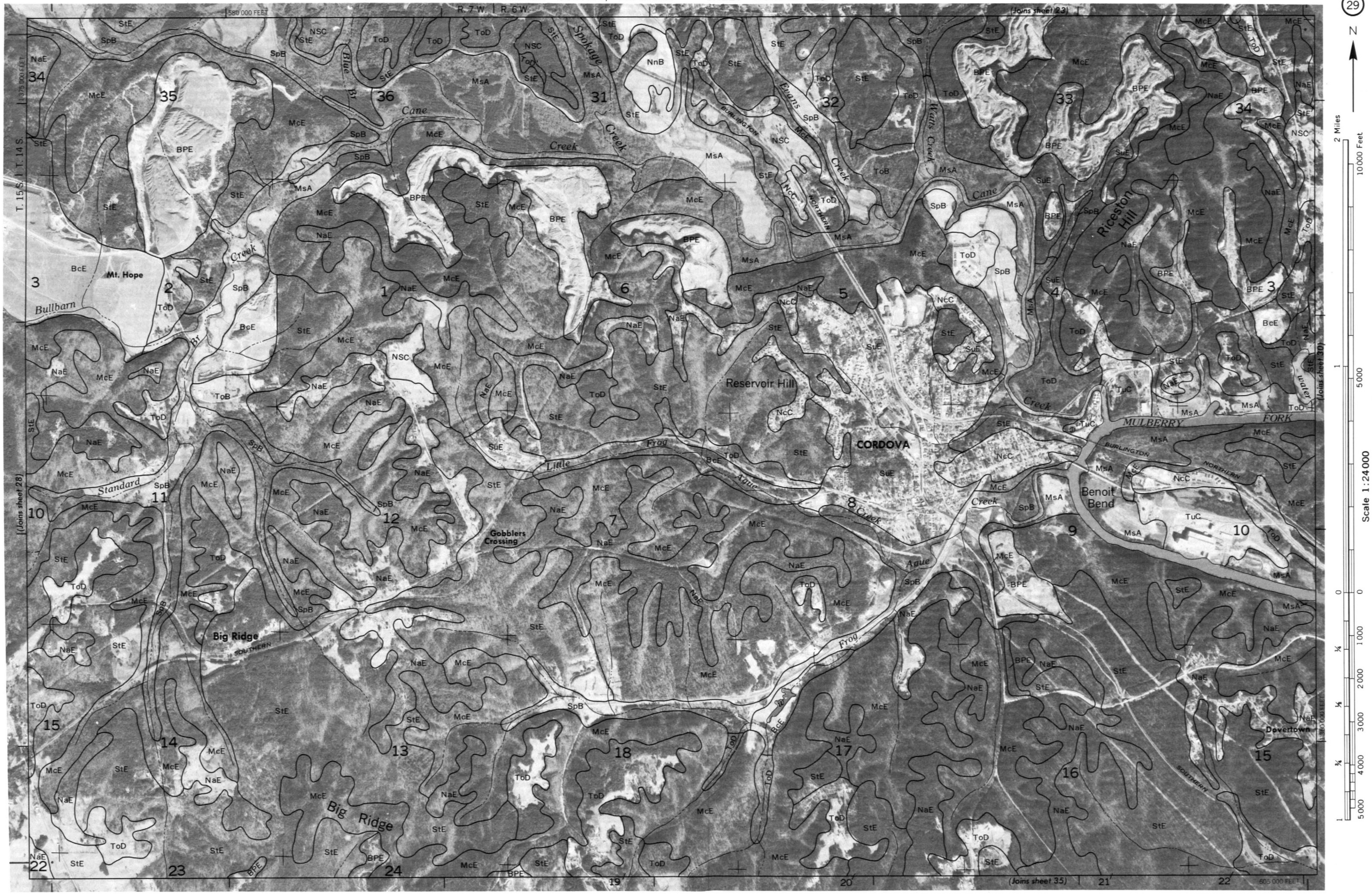
N

2 MILES

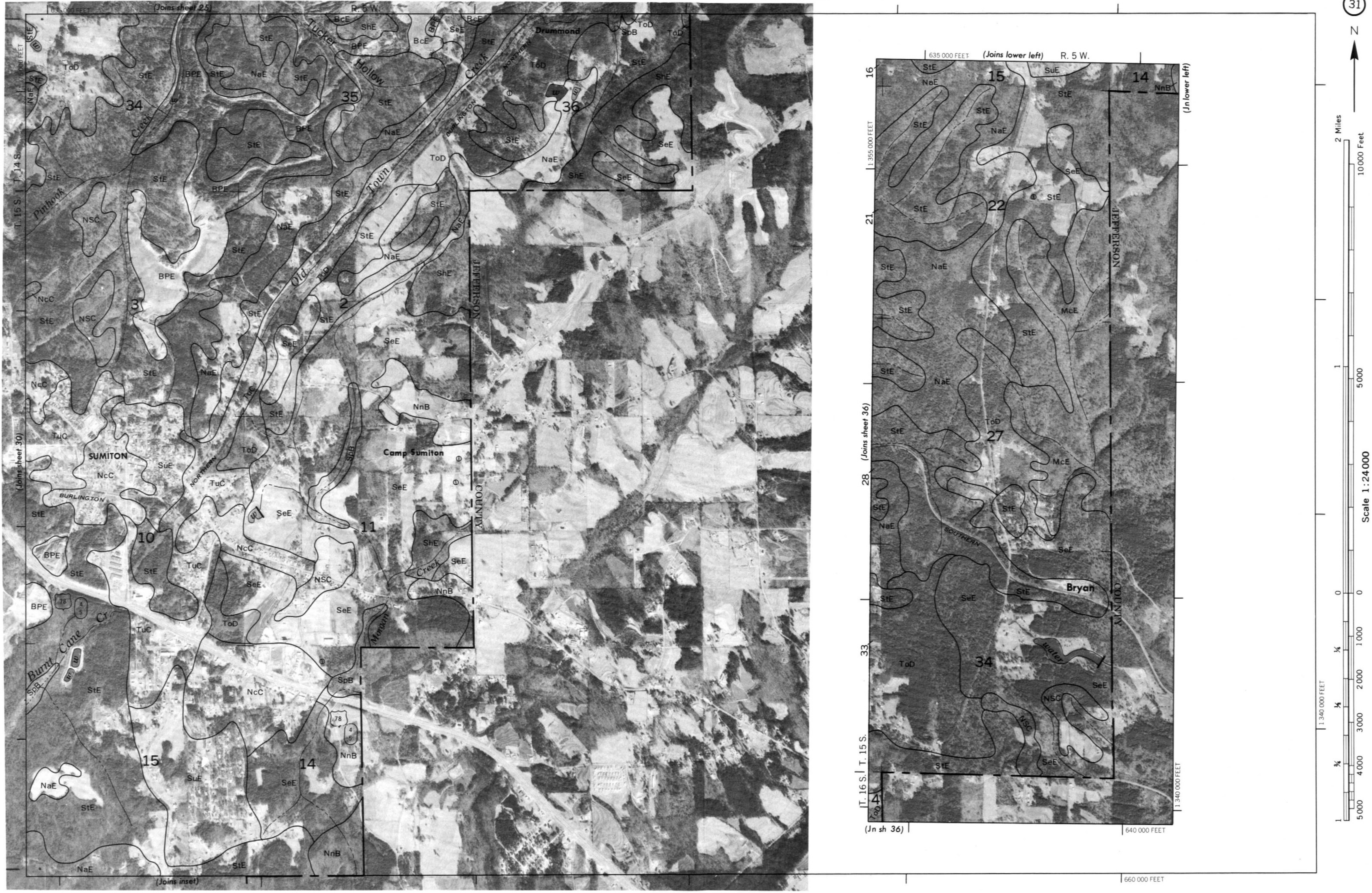
2 KILOMETERS

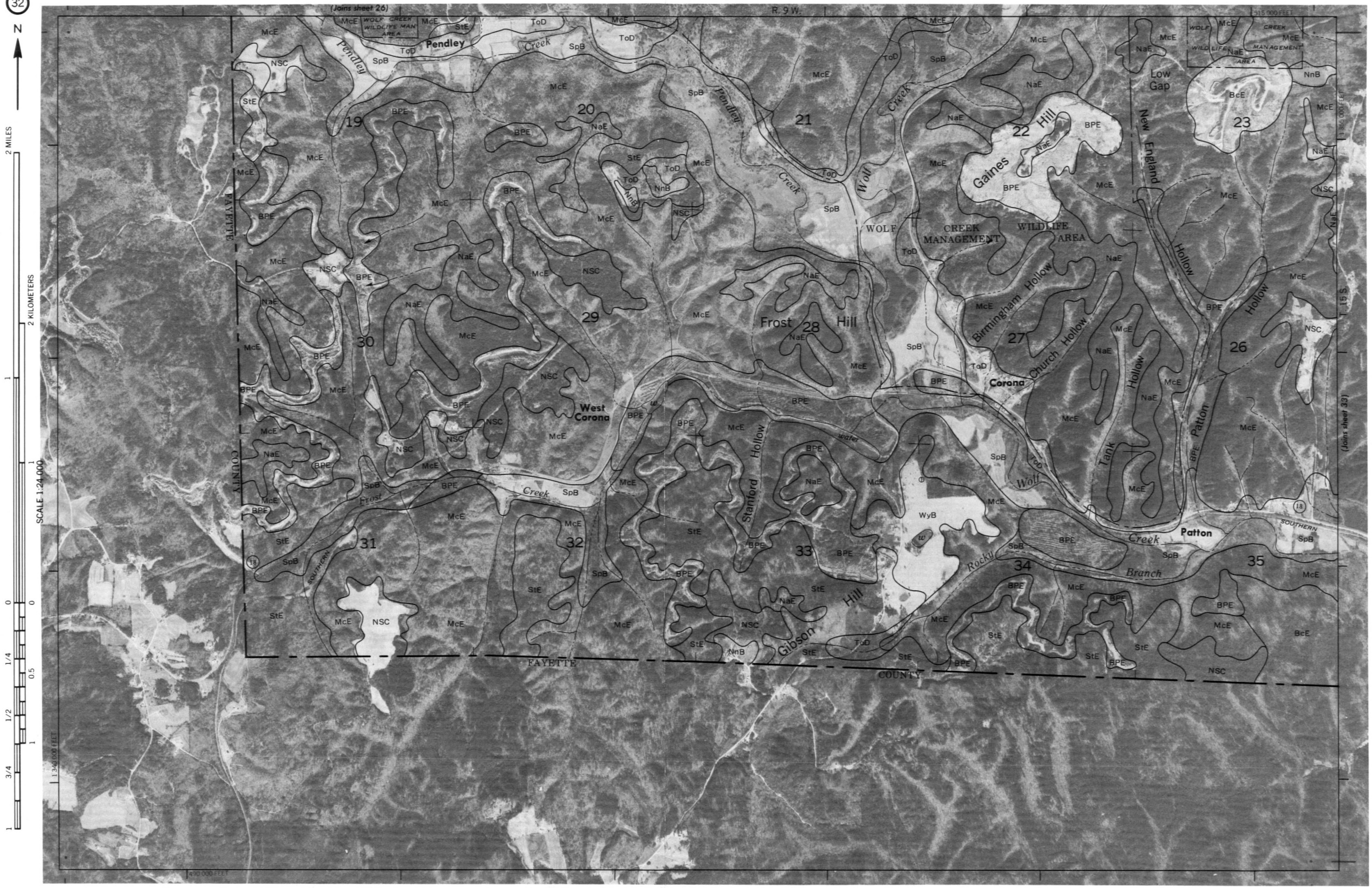
SCALE 1:24 000

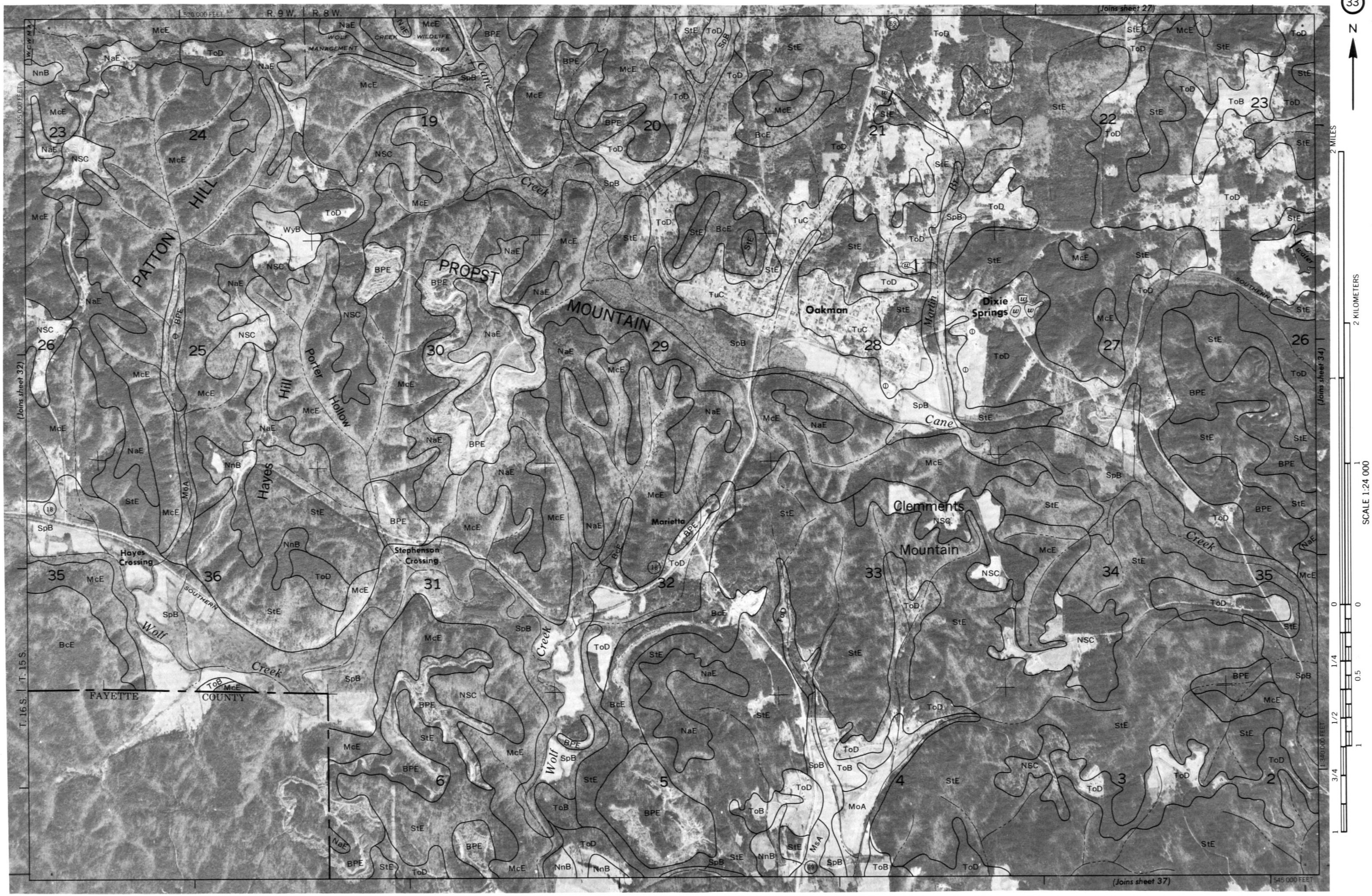



29
(Joins sheet 23)
(Joins sheet 28)
(Joins sheet 30)
(Joins sheet 35)
580 000 FEET
605 000 FEET
R. 7 W. | R. 6 W.
T. 15 S. | T. 14 S.
Mt. Hope
Bullbarn
Blue Br
Cane Creek
Spokane Creek
Evans Creek
Watts Creek
Riceston Hill
BURLINGTON NORTHERN
Reservoir Hill
CORDOVA
MULBERRY FORK
Benoit Bend
Little Frog Aque Creek
Standard Br
Gobblers Crossing
Big Ridge
SOUTHERN
Dovertown
N
Scale 1:24 000
2 Miles
10000 Feet


N
2 Miles
10000 Feet
5000
Scale 1:24 000
(Joins sheet 24)
(Joins sheet 29)
(Joins sheet 31)
(Joins sheet 36)
R. 6 W.
R. 5 W.
T. 15 S.
T. 14 S.
MULBERRY FORK
Stovatt Bend
The Pinnacle
Rocky Hollow
Britton
Creek
Pinhook Creek
Hull
Dora Junction
SUMITON
Lorton
Sloss
Kershaw
KERSHAW HOLLOW
Benoit
Rock Creek
Horse Creek
MULBERRY FORK
Bough Bend
Dovertown
Flat
NORTHERN
BURLINGTON
DORA
West Fork
Burnt Cane Creek
water
34
35
36
31
32
33
34
3
2
1
6
5
4
3
10
11
12
7
8
9
10
15
14
13
18
17
16
15
22
23
24
19
20
21
22

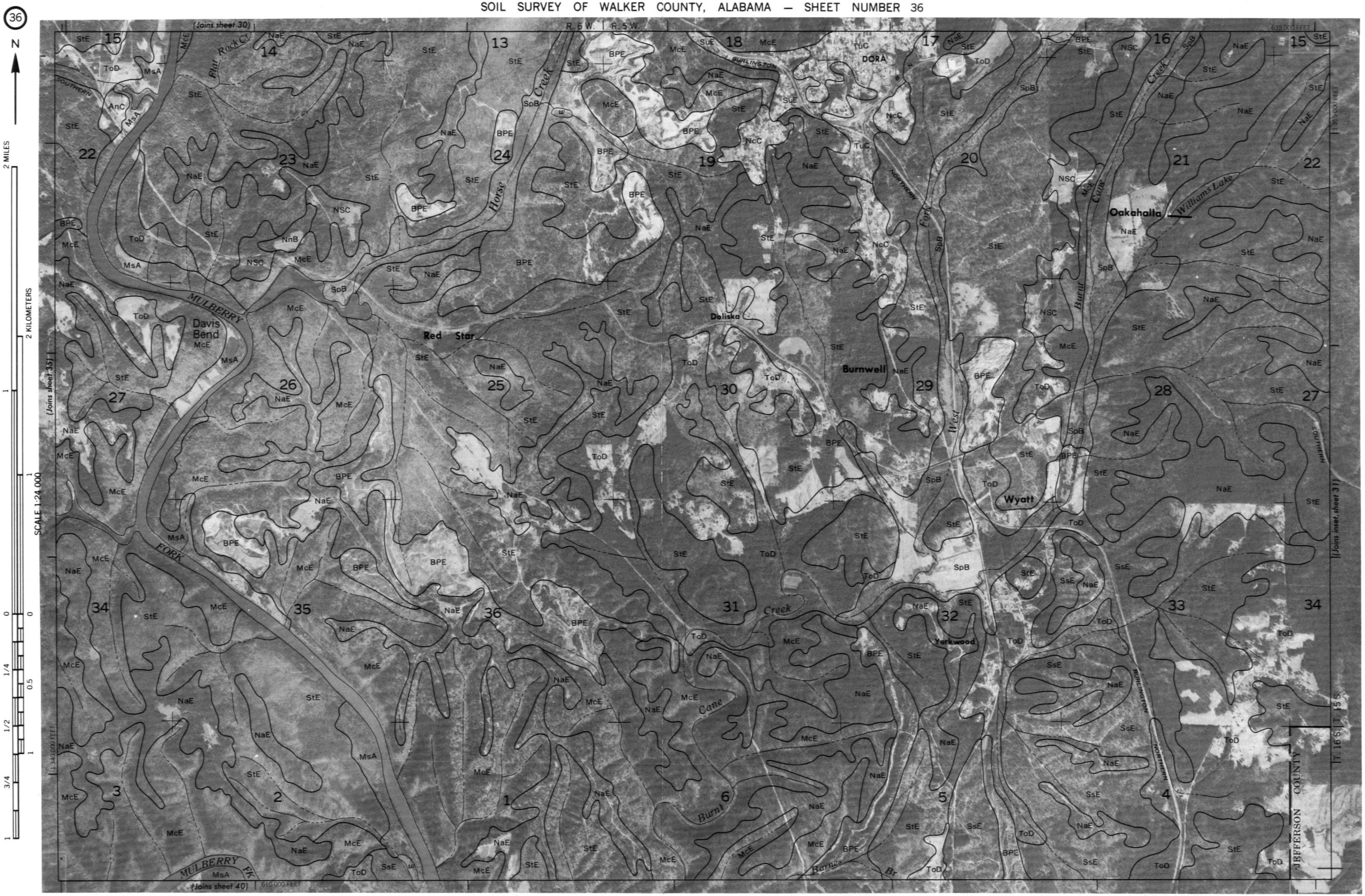

(Joins sheet 25)
635 000 FEET
R. 5 W.
Drummond
Tucker
Hollow
Creek
Old Town Creek
Pinhook Creek
Burnt Cane Cr
Morgan Creek
SUMITON
Camp Sumiton
BURLINGTON
NORTHERN
JEFFERSON COUNTY
(Joins sheet 30)
(Joins inset)
T. 14 S.
T. 15 S.
34
35
36
3
2
10
11
15
14
StE
ToD
NaE
BPE
ShE
SeE
SpB
NcC
NSC
TuC
SuE
NnB
BcE
(Joins lower left)
R. 5 W.
15
14
22
27
34
4
16
21
28
33
1 355 000 FEET
(Joins sheet 36)
SOUTHERN
Bryan
water
McE
NnB
T. 15 S.
T. 16 S.
(Jn sh 36)
640 000 FEET
1 340 000 FEET
(Jn lower left)
660 000 FEET
31
N
2 Miles
10 000 Feet
Scale 1:24 000

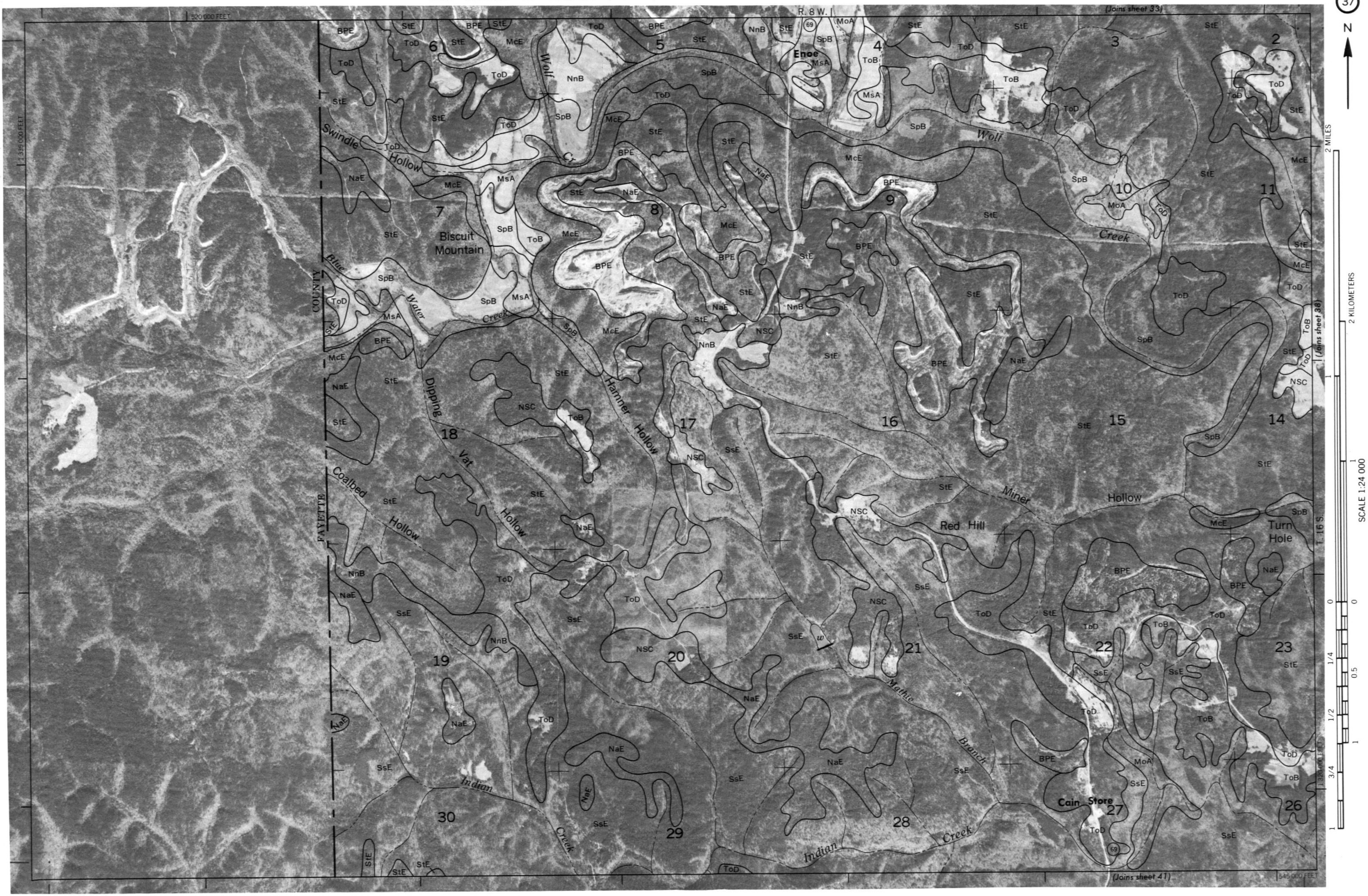

N
2 MILES
2 KILOMETERS
SCALE 1:24 000
(Joins sheet 26)
(Joins sheet 33)
R. 9 W.
T. 15 S.
WOLF CREEK WILDLIFE MANAGEMENT AREA
Pendley
Pendley Creek
Wolf Creek
Gaines Hill
Low Gap
New England
Frost Hill
Birmingham Hollow
Church Hollow
Tank Hollow
Hollow
Patton Hollow
Corona
West Corona
Stanford Hollow
Frost Creek
Gibson Hill
Rocky Branch
Patton
SOUTHERN
FAYETTE COUNTY
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35
McE
NaE
BPE
NSC
StE
ToD
SpB
NnB
BcE
WyB


33
N
(Joins sheet 27)
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 37)
R. 9 W.
R. 8 W.
T. 15 S.
T. 16 S.
WOLF CREEK WILDLIFE MANAGEMENT AREA
PATTON HILL
PROPST
MOUNTAIN
Porter Hollow
Hayes Hill
Cane Creek
Wolf Creek
Martin Br.
Oakman
Dixie Springs
Clemments Mountain
Marietta
Hayes Crossing
Stephenson Crossing
FAYETTE COUNTY
SOUTHERN
SCALE 1:24 000
2 MILES
2 KILOMETERS


34
N
R. 8 W.
R. 7 W.
(Joins sheet 28)
(Joins sheet 33)
(Joins sheet 35)
(Joins sheet 38)
Providence
Gayosa
Parrish
WILLIAMSTOWN
Lost Creek
Indian Creek
Bryants Creek
Coal Creek
Cane Creek
Gayosa Mountain
Blue Ridge
Savage Hollow
Coon Hollow
Providence Branch
SOUTHERN
2 MILES
2 KILOMETERS
SCALE 1:24 000
T. 15 S.
T. 16 S.
575 000 FEET
350 000 FEET
1 340 000 FEET
1 355 000 FEET


R. 7 W.
R. 6 W.
580 000 FEET
1 355 000 FEET
1 340 000 FEET
605 000 FEET
(Joins sheet 29)
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 39)
T. 15 S.
T. 16 S.
Big Ridge
Aldridge
Bradleytown
Barney
Drifton
Pea Ridge
Lard Creek
Frog Ayne Creek
Barton Creek
Mosquito Creek
Baker Creek
SOUTHERN
water
StE
McE
BPE
ToD
NaE
NSC
SpB
NnB
N
2 MILES
2 KILOMETERS
SCALE 1:24 000

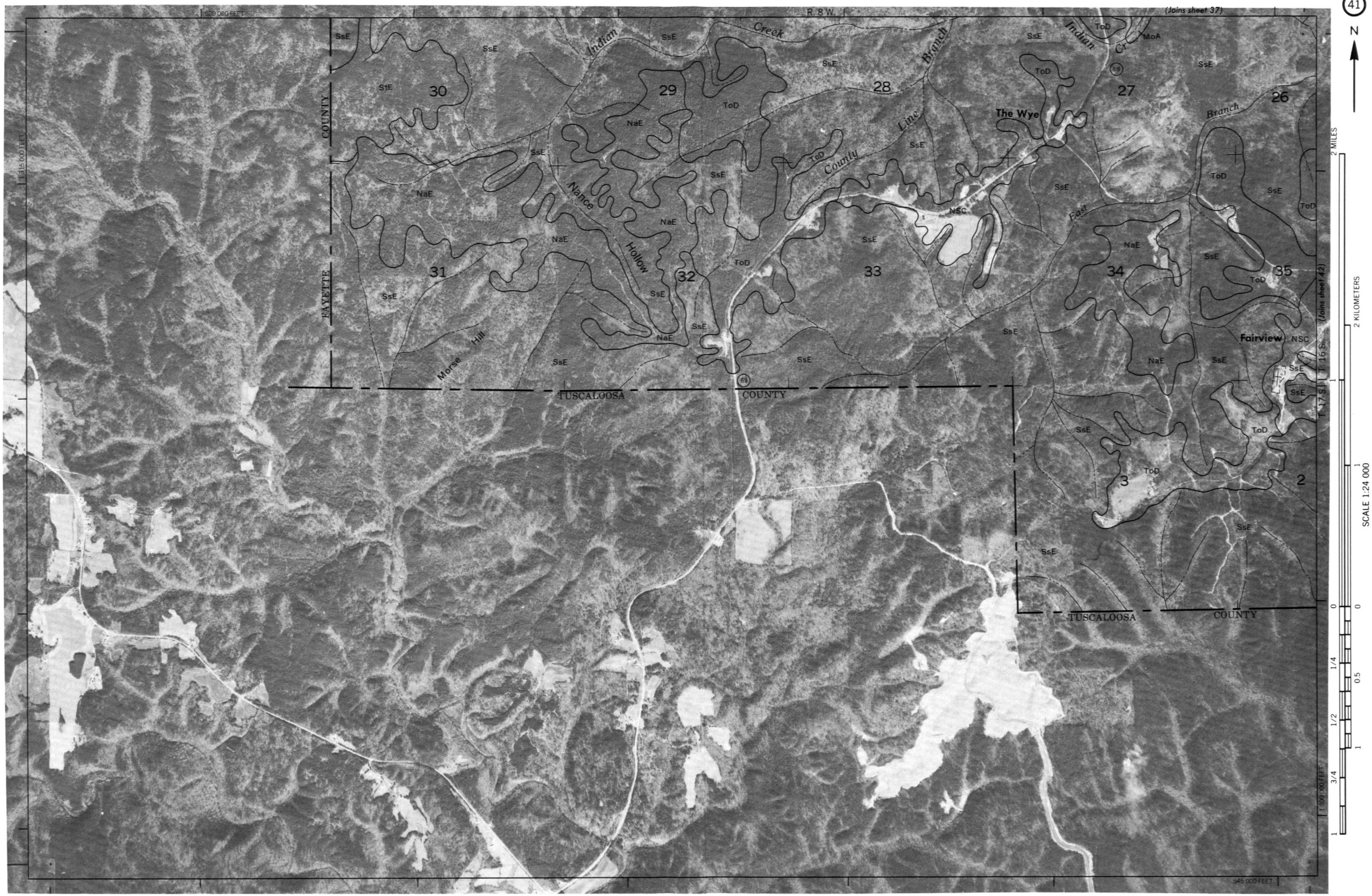

36
N
2 MILES
2 KILOMETERS
SCALE 1:24 000
(Joins sheet 30)
(Joins sheet 35)
(Joins inset, sheet 31)
(Joins sheet 40)
R. 6 W. | R. 5 W.
635 000 FEET
1 355 000 FEET
1 340 000 FEET
610 000 FEET
T. 15 S. | T. 16 S.
JEFFERSON COUNTY
DORA
Oakahalla
Williams Lake
Davis Bend
Red Star
Doliska
Burnwell
Wyatt
Yorkwood
MULBERRY
FORK
MULBERRY FK
Flat Rock Cr
Horse Creek
West Fork
Burnt Cane Creek
Cane Creek
Burnt Cane
Barnes Br
BURLINGTON
NORTHERN
SOUTHERN


37
N
(Joins sheet 33)
(Joins sheet 38)
(Joins sheet 41)
R. 8 W.
T. 16 S.
520 000 FEET
545 000 FEET
FAYETTE COUNTY
Enoe
Biscuit Mountain
Red Hill
Turn Hole
Cain Store
Wolf Cr.
Wolf Creek
Swindle Hollow
Blue Water Creek
Dipping Vat Hollow
Hamner Hollow
Coalbed Hollow
Miner Hollow
Mathis Branch
Indian Creek
69
2 MILES
2 KILOMETERS
SCALE 1:24 000
StE
ToD
ToB
BPE
McE
SpB
NnB
MsA
MoA
NaE
NSC
SsE
1
2
3
4
5
6
7
8
9
10
11
14
15
16
17
18
19
20
21
22
23
26
27
28
29
30


R. 8 W.
R. 7 W.
(Joins sheet 34)
(Joins sheet 37)
(Joins sheet 39)
(Joins sheet 42)
N
2 MILES
2 KILOMETERS
SCALE 1:24 000
T. 16 S.
Coon Hollow
Reeses Branch
Bear Gap Branch
Wade Branch
McDuff Branch
Spring Branch
Lost Creek
The Narrows
Wolf Creek
Kilgore Branch
Evans Bridge
The Shin Bone
Indian Creek
Cedar Creek
Rocky Br
Prices Bridge
LOST CREEK
water

SOIL SURVEY OF WALKER COUNTY, ALABAMA — SHEET NUMBER 39

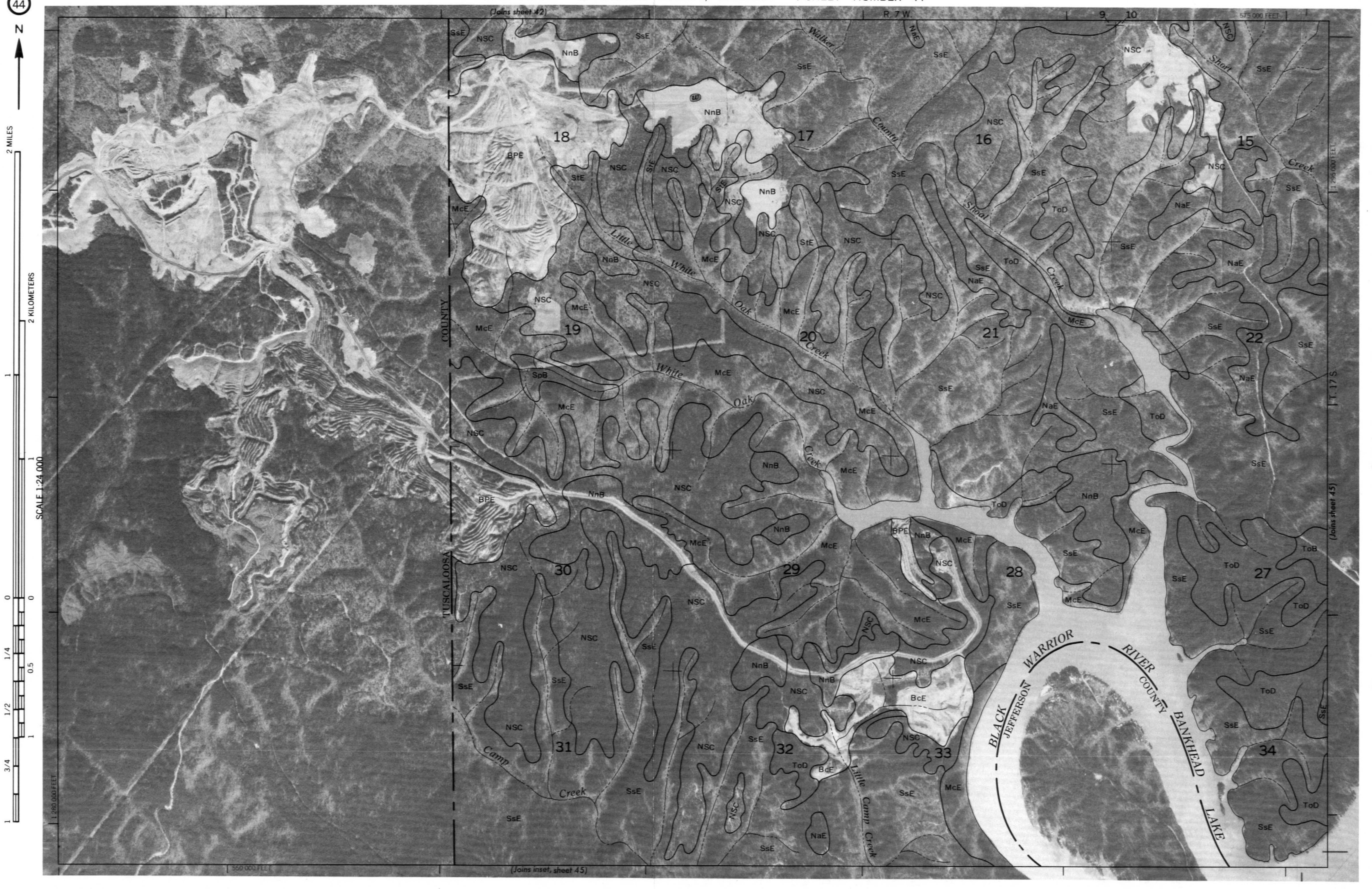

40
N
R. 6 W. | R. 5 W.
(Joins sheet 36)
(Joins sheet 39)
(Joins inset, sheet 43)
T. 16 S.
SCALE 1:24 000
2 MILES
2 KILOMETERS
Tuggle Bend
Shepherd Bend
MULBERRY FORK
Burnt Cane Creek
Barnes Branch
TWILLEY TOWN
Quinton
Flat Creek
Pumpkin Center
Wegra
Coal Creek
JEFFERSON COUNTY
JEFFERSON COUNTY

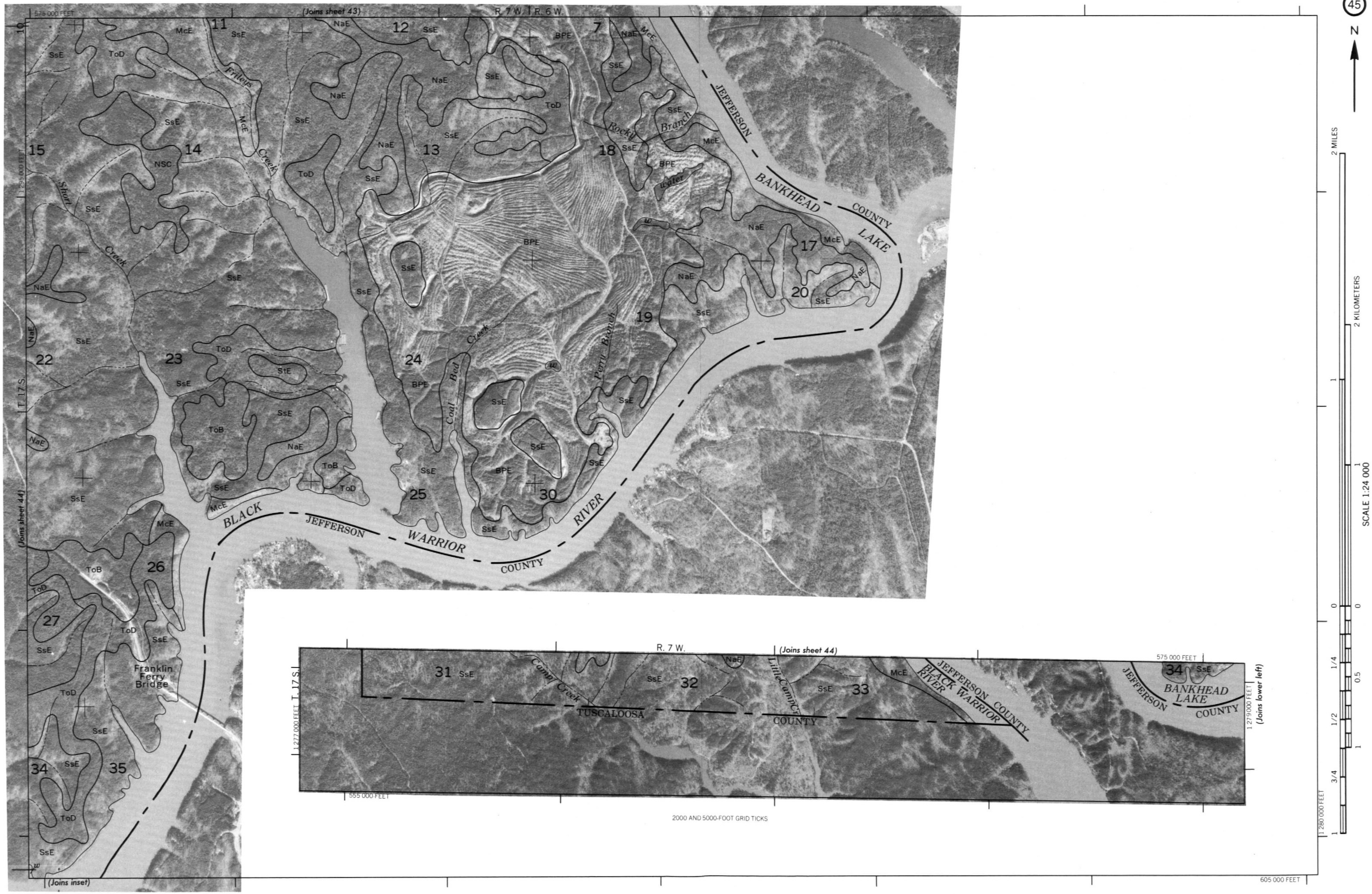

41
N
(Joins sheet 37)
(Joins sheet 42)
R. 8 W.
T. 16 S.
T. 17 S.
FAYETTE COUNTY
TUSCALOOSA COUNTY
The Wye
Fairview
Indian Creek
Indian Cr
Branch
County Line Branch
East Branch
Nance Hollow
Morse Hill
69
26
27
28
29
30
31
32
33
34
35
2
3
SsE
StE
NaE
ToD
MoA
NSC
2 MILES
2 KILOMETERS
SCALE 1:24 000
1
0
1/4
1/2
3/4
0.5


42
N
R. 8 W. | R. 7 W.
(Joins sheet 38)
(Joins sheet 41)
(Joins sheet 43)
(Joins sheet 44)
2 MILES
2 KILOMETERS
SCALE 1:24 000
T. 17 S. | T. 16 S.
TUSCALOOSA COUNTY
Browntown
Chapel Hill
Richardson
Busby Hollow
Indian Creek
Little Indian Creek
Cedar Creek
Canaan Branch
Lightfoot Branch
Frileus Creek
Walker County Shoal Creek
Hollow

R. 7 W. | R. 6 W.
(Joins sheet 39)
(Joins sheet 42)
(Joins inset)
(Joins sheet 45)
575 000 FEET
1 315 000 FEET
605 000 FEET
T. 16 S.
T. 17 S.
Busby Hollow
Richardson Hollow
Richardson Slough
MULBERRY FORK
Franklin Bend
Miller Slough
Flint Ridge
Bluff Creek
Prescott Creek
Canaan Branch
Lightfoot Branch
Kisner Slough
Frileys Creek
White Branch
water
JEFFERSON COUNTY
StE SsE NaE McE BPE MoA NSC SpB ToD NnB
R. 6 W.
(Joins sheet 40)
605 000 FEET
1 318 000 FEET
1 315 000 FEET
608 000 FEET
(Joins upper right)
T. 16 S.
3000-FOOT GRID TICKS
N
2 MILES
2 KILOMETERS
SCALE 1:24 000
1 300 000 FEET

SOIL SURVEY OF WALKER COUNTY, ALABAMA — SHEET NUMBER 44




45
N
(Joins sheet 43)
R. 7 W. | R. 6 W.
575 000 FEET
1 295 000 FEET
T. 17 S.
(Joins sheet 44)
(Joins inset)
Frileys Creek
Short Creek
Rocky Branch
Coal Bed Creek
Perry Branch
water
BANKHEAD LAKE
JEFFERSON COUNTY
BLACK WARRIOR RIVER
Franklin Ferry Bridge
Camp Creek
Little Camp Cr.
TUSCALOOSA COUNTY
R. 7 W.
555 000 FEET
1 277 000 FEET
1 279 000 FEET
(Joins lower left)
1 280 000 FEET
605 000 FEET
2000 AND 5000-FOOT GRID TICKS
2 MILES
2 KILOMETERS
SCALE 1:24 000